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45

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ISSUE 45

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Sculpt & texture flying vehicles

Films like *Blade Runner*, the *Alien* movies and *TRON* all have one thing in common: Syd Mead's incredible visions of future transport. Take *Total Recall* for example – the inspiration of Syd Mead clearly lives on in Harald Belker's designs; meanwhile *The Dark Knight Rises* offers pleasurable viewing experiences as The Bat and its Batcycle fly and soar across screens around the world.

We couldn't help but be inspired, so this issue celebrates awesome vehicle design with two fantastic tutorials: learn how to concept and build a unique battleship in ZBrush, and then take your skills to the next level using MARI with our guide to texturing a stunning stealth plane. MARI is used extensively in the industry to speed up texturing workflow for film and TV, so if your dream is to work on the next blockbuster, these tricks should help you get a good night's sleep...

Artistinfo

Nick Kaloterakis

Personal portfolio site
www.kollected.com

Country Australia

Software used
Maya, mental ray, Photoshop

If you ever need vehicle eye candy, Nick's portfolio is the place to go, with some of the most incredibly detailed illustrations we've seen!

Inspired by his visionary vehicles, we asked the talented Istvan to concept and build a battleship, while setting Daniele Orsetti the task of texturing a stealth plane, as part of our futuristic vehicle special.

Taking ZBrush, Illustrator and insects, Istvan teaches us how to create unique vehicles. **Page 68**

MPC's Daniele Orsetti reveals the secrets of his texturing workflow. **Page 74**

> "Even though we're making a battleship here, the method described can be used to model a whole host of... vehicles, buildings, weapons and more"

Istvan takes us through the creation of a sci-fi vehicle **Page 68**

Welcome

to the magazine and 116 pages of amazing 3D

Every issue you can count on...

1. **116 pages of creative inspiration**
2. Behind-the-scenes guides to images and fantastic artwork
3. **A disc packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

Welcome to issue 45, where page after page of inspirational art, in-depth guides and practical advice aims to help you on the way to complete awesomeness.

Whether you want to craft environments, model organic assets or perfect your hard-surface sculpting, we've captured it all within the following pages. And remember: your skills are transferable! While a tutorial within **3D Artist** may teach the art of modelling a plant, the techniques can be applied to an array of images. If a project is created in a software you don't ordinarily use, try not to dismiss it but look *inside* it; transfer the concepts and workflow to your favourite 3D packages – seek inspiration everywhere!

Lynette Clee, Deputy editor

This issue's team of expert artists...

Istvan

Our talented Swiss friend takes us from concept to render in ZBrush to create a detailed battleship from... a bug!

Pawel Podwojewski

The arch-vis master returns to teach us to build assets from scratch for better scenes. This issue, it's photoreal plants

Neil Maccormack

Concept artist extraordinaire gives fantastic insight into the creation of an epic sci-fi environment scene in LightWave

Jahirul Amin

J steps up the game with a masterclass in rigging to help push your skills to the next level, complete with rewired videos

Daniele Orsetti

Daniele kindly takes time out to teach us his texturing workflow. Currently working at MPC, this is a man in the know!

Digital-Tutors

Help your skills take flight with a helpfully in-depth Q&A tutorial from the expert instructors on how to rig wings in 3ds Max

Luis Santos

Who doesn't love a good zombie? Learn to texture convincing flesh and gore in Luis' Q&A tutorial on how to zombify in Mudbox

Richard Yot

When readers asked how to benefit from a mocio and ZBrush workflow, we turned to Richard Yot to teach us how...

Sinan Buyukbas

A hive of all CINEMA 4D knowledge, motion designer Sinan takes us on an adventure of stunning 3D type creation

Bernat Cuni

The man of many cups (3D-printed ones) ventures into colour with an expert tutorial on preparing models for 3D prints

Ross Board

3D Artist regular Ross gets stuck into the Ultimate Autodesk Entertainment Creation Suite to find out what's new...

Orestis Bastounis

Orestis checks out the WS1850 to find out if designers with five grand burning a hole in their pocket will be impressed

Sign up, share your art and chat to other artists at www.3dartistonline.com

3D Artist

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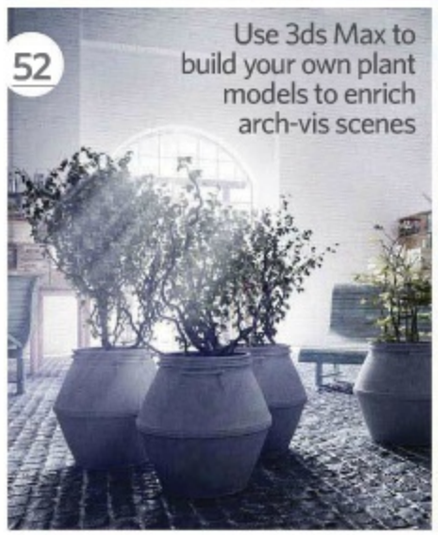

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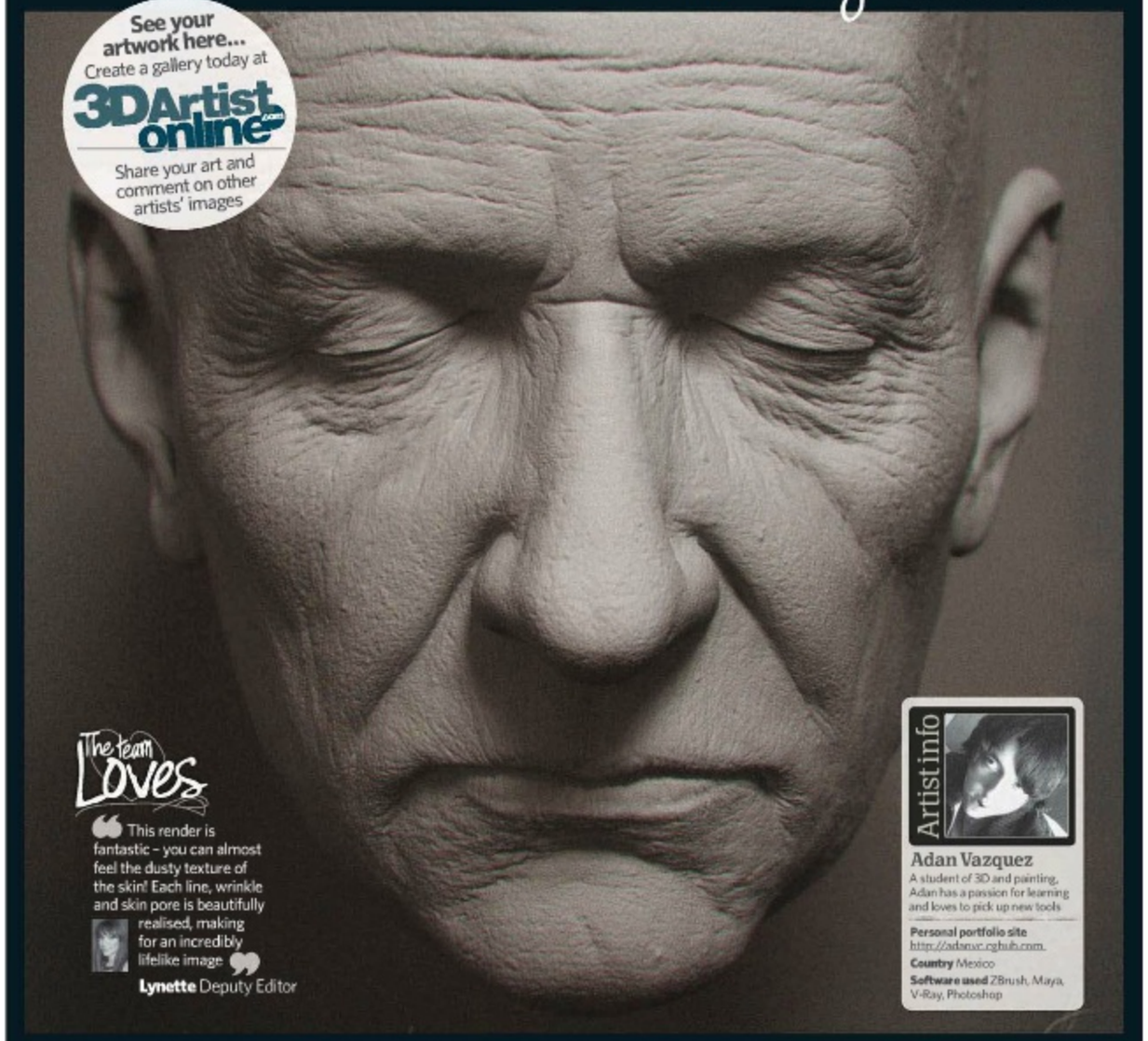
WELCOME TO THE GALLERY

Six pages of great artwork from the 3D community

Images we love!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This render is fantastic – you can almost feel the dusty texture of the skin! Each line, wrinkle and skin pore is beautifully realised, making for an incredibly lifelike image
Lynette Deputy Editor
Artist info
Adan Vazquez
A student of 3D and painting, Adan has a passion for learning and loves to pick up new tools
Personal portfolio site
http://adanvc.cghub.com
Country Mexico
Software used ZBrush, Maya, V-Ray, Photoshop

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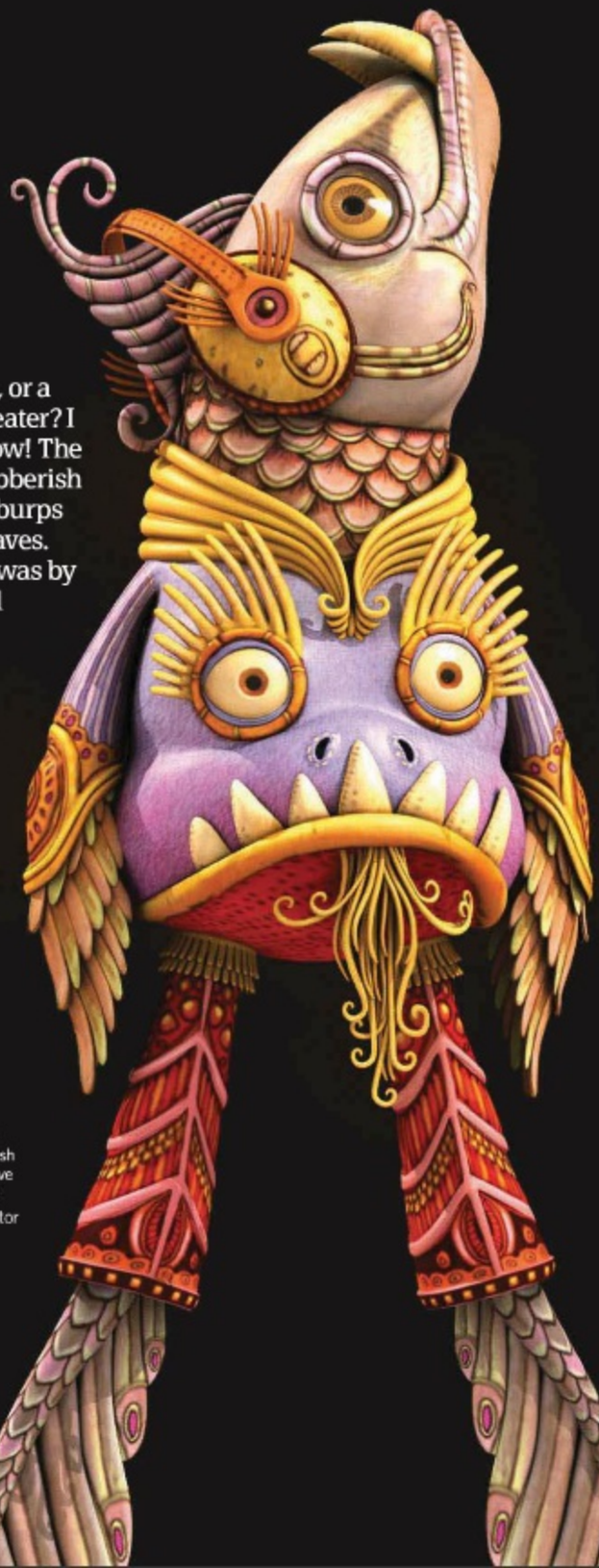

“Is it a sweater wearing a fish hat, or a fish wearing a sweater? I honestly don't know! The sweater speaks gibberish and the fish head burps cherry blossom leaves. The initial design was by my talented friend Ree Treweek”

Stanley Segal, *Fishy*, 2012

Artist info

Stanley Segal

Stanley is a lead 3D artist at Shy the Sun Productions (www.shythesun.tv).

3DArtistonline

Username: StanleySegal

Personal portfolio site
www.behance.net/stanleysegal

Country South Africa

Software used
Softimage, Photoshop

Work in progress...

Original concept by Ree Treweek

The team Loves

“This bold and striking image is quirky and unique – we like to think it's a fish wearing a sweater. Love his headphones!”

Lynette Deputy Editor

Artist info

Jared Krichevsky

Jared completed the CG Certificate program at Gnomon School of Visual Effects in 2010.

Personal portfolio site
www.jaredkrichevsky.blogspot.com.

Country California

Software used
ZBrush, Photoshop

Work in progress...

The team Loves

“There's a real sense of power and scale to this lumbering, mountainous creature. You can imagine him tearing himself from the ground, standing up and having a big stretch!”

Chris News Editor

“When I was a kid going on long car trips, I would sit and look out of the windows at the mountains. I always saw faces in the shapes of the rocks and trees. I wondered what it would be like if there were creatures hiding”

Jared Krichevsky, *Strollin'*, 2012

THE GALLERY

The team loves

Tom has composited his Mustang seamlessly into this environment. A great showcase of how a HDRI lighting setup can help achieve believable results!

Lynette Deputy Editor

Artist info

Tom Burle Isaksen

Tom is a Brazil-based 3D character artist with over 12 years of industry experience.

3DArtist online

Username: CharacterInk

Personal portfolio site
www.characterink.com

Country Denmark

Software used
3ds Max

Work in progress...

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The 1970 Ford Mustang Mach 1 is probably my favourite car of all time. I used to own a car just like this, which was my motivation for making it in 3D. Brought back a lot of good memories! Rendered with a HDRI map using V-Ray on a photograph backdrop **Tom Burle Isaksen,** *Mustang Mach 1, 2012*

The team Loves

Truly the stuff of nightmares, this beast is made even more terrifying with its slimy material, while the depth of field amplifies the sense of scale

Lynette Deputy Editor

This concept was the result of my efforts to put into action all the info and titbits I've acquired [while] learning... to master ZBrush

Nirmal Thomas, *Gargoyle*, 2011

Artist info

Nirmal Thomas

Nirmal is a full-time freelance artist specialising in concept art, illustration and 3D modelling.

Personal portfolio site
artnirvaana.blogspot.com

Country India

Software used
ZBrush, Photoshop

Work in progress...

Created by Illusion Bangkok for JWT Shanghai by Surachai Puthikulangkura. Rendered in modo® with final touchup in Photoshop.

Luxology.com/modo/tour

create art in unexpected places

modo

"I wanted to make [the image] so even a beginner could do a 3D version of it..." says Birault
Original concept ©Serge Birault, www.sergebirault.fr
Model by Krishnamurti M. Costa
Model by Yinxuan Li Dezarmenien
Image by Dmitry Cheremisin

Serge Birault's 3D challenge

The master of pin-ups challenged the CG community to transform one of his sketches into 3D

Accomplished 2D illustrator Serge Birault recently took to his Facebook Page (www.facebook.com/serge.birault) to launch a competition with his close-knit community of followers. The rules were simple: re-create Birault's 2D sketch in full 3D, using tools and software of your choice.

"I started this competition for various reasons," says Birault. "The first was to promote 3D artists who don't have a large audience. A lot of people follow me on Facebook so it was a good way for these guys to share their work.

"Second, I used to work with 3D guys for videogames or animated series and usually I'd do the 2D concept and I wouldn't get to the see the 3D model until several months later. This time I was able to see a lot of the process, the steps and WIPs."

The winner was the ever-popular Krishnamurti M. Costa with his silver-haired take on Birault's character, with artists Dmitry Cheremisin and Yinxuan Li Dezarmenien coming in as runners-up.

"Competitors were free to do their own interpretation of the concept. I didn't want to have hundreds of perfect copies, that would have been useless," says Birault. "Krishnamurti is the true master of ZBrush – his technical level is of such high quality that no one can best him there. He did a very personal version that we liked very much. Dmitry's model is very close to the original sketch, but his entry felt the most alive. I really like the eyes and look of his character. Yinxuan's model is also close to the sketch, but she gave it a manga touch."

Although the competition hasn't inspired Birault to try out 3D art in his own work – "I'm still unable to do a good or interesting 3D model. I'm too old to learn how to use new software!" he says – it has opened his eyes to the difficulties 3D art presents.

> I didn't want to have hundreds of perfect copies, that would have been useless **Serge Birault**

"I really like reflective materials like metal, plastic, latex, rubber, vinyl... it's easy to fake reflective materials in 2D, but I've now realised how hard it is to do the same in 3D."

This meeting of the 2D and 3D worlds doesn't stop here. "I've had very positive feedback on the challenge," he adds. "Social networks are great places to create challenges like this. We'll definitely try to do more on various CG forums. Stay tuned!"

Krishnamurti M. Costa

» www.antropus.com

How did you give a unique style to the concept?
I went more realistic than most artists. I thought I could get in trouble for that, but at the same time that was the direction I was having fun with and it's very important that you have fun when you enter a challenge. There are many ways you can match the concept exactly, following it as a blueprint, but that was never my intention.

How did you create the winning image?
I started using a generic female model I created years ago that I use as a starting point for almost everything, including monsters. I pushed it to get a more cartoon look, while not going totally cartoon. All the sculpting and textures were done in ZBrush and then I started to use preliminary versions of the image for rendering using Maya/V-Ray. For the hair, I used ZBrush's FiberMesh, exported it as Curves directly to Maya and then rendered using Maya Hair.

I rendered the image in passes to get some extra control in the specular/reflections and also GI. Everything was then comped in Photoshop.

Will you enter a competition like this again?
Every time I compete I say "this was the last one", and for some weird reason I always manage to enter again... go figure! If it's a combination of a good concept that inspires me, friendship with other fellow artists and the improvement of my skills, I might enter.

Dmitry Cheremisin

» www.d33mOn.cghub.com

How did you apply your own style?
At first I tried to make the model similar to the original drawing, but then decided to add some of my own elements. I changed the octopus tentacle, the shape of her hair, and added more details to the base concept, such as the buckles on the straps and rivets. I decided to make the surface smooth and shiny, which is Serge's style.

Tell us how you created your interpretation?
Almost all the work was done in ZBrush. I used DynaMesh for creating basic forms, retopology in 3ds Max and then transferred it to new sculpting topology. The mesh of the model turned out clean and more optimised. For the textures I used ZBrush and Photoshop. All materials were made in 3ds Max and they are very simple. For the final image I used render elements (render passes), which I combined in Photoshop.

Yinxuan Li Dezarmenien

» www.tyanim.com

What drew you towards re-creating this particular concept by Serge?
I'm used to designing and working on my own style, but I really want to try some other styles, so when I saw Serge's sketch and the contest on Facebook I was immediately interested! There was already lots of nice work, everyone was full of passion and had their own features and highlights, and that inspired me. I wondered if I could do a sexy girl model like that. I had to try it!

How did you feel about the style of work?
I started by following the original sketch to find her expressions, posture and demeanour, but then I added a touch of my own style.

Can you briefly explain the creation process?
I was learning ZBrush when I started this work, so I started using ZBrush to do some simple references. After that I used modo for modelling, Maya for posing and modo for rendering. I used Photoshop for [adjustments].

For Birault, the competition did have its downsides: "I had to post all the pictures myself, and there were more than 300 this time!"
Image by Yinxuan Li Dezarmenien

Blog watch

A guide to inspiring and informative blogs!

www.cartoonbrew.com

A vast pool of animation knowledge covering both classic and contemporary works

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www.cartoonbrew.com

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Artist spotlight

Visual development

Landis Fields discusses the role of 3D in the process of creating concept art for today's movies

Landis Fields www.landisfields.com

Although Fields' career started out worlds away from the creativity of 3D art – beginning with a six-year stint working for the US Air Force as a communications and navigations systems specialist – he has since worked for a variety of companies including Lucasfilm Animation and The Orphanage.

"Today 3D is a staple in concept art because it saves time," Fields says. "Studios want directors to show them what the movie is going to look like before they invest, so it's important that the work is done fast, looks great and gets the point across or the movie doesn't get made. Ultimately I make sizzle pieces; I work in the very early stages of a project to help get it green-lit."

Fields says that because 3D concept art is so malleable, it can be dissected by all phases of the pipeline to make it fit a director's ever-changing vision. However, there's always that possibility that such early concept art will never be seen. "I have to embrace the mindset that the world may never see any of the work!" Thanks to 3D Artist, not this time!

Free 3D Resources

Show off your 3D art

A new website that enables anyone to publish interactive 3D content online

WebGL 3D model uploader

Web: www.sketchfab.com

Sketchfab has gone live with new technology that enables users to publish interactive 3D content online. It's completely free and requires no third-party application installed on either the client side or the server – all it needs is for the end-user to be running a WebGL-compatible browser. Once you've uploaded your work others can view it from a variety of different angles. You can also use an embed code to display the work on other websites, as simply as you would a YouTube video. Future plans include adding extra recognised formats and rendering features, and working on scripts to export directly from various 3D software products to the site.

Sketchfab
Publish interactive 3D content online

Behind the scenes

Show me the reel

We talk to Jakub Goda about how his showreel is itself a demonstration of his skills

Jakub Goda http://jakubgoda.com

23-year-old Jakub Goda's 2012 showreel (viewable at www.vimeo.com/40778074) is the perfect demonstration of how to use a showreel to not just demonstrate your work, but also your presentation and editing skills. The video flips and shifts between different frames of film, each displaying another snippet of Goda's impressive portfolio.

"The showreel is a recapitulation of the most interesting personal and commercial projects I've worked on over the last five years," says Goda. "The edit and finalisation of the showreel was done in After Effects, and I used plug-ins like Sound Keys or Twitch for certain effects."

For Goda, presentation is just as important as content. "Good music choices, good editing and creating a certain rhythm and pace helps a lot. It makes a huge difference if you connect your shots in interesting ways," he adds. "Good showreel music will work with individual cuts and give it a good pace."

New Designers 2012

Nine UCA Rochester graduates showcase old and new animation styles

The New Designers event recently took place at the Business Design Centre in London, bringing together over 3,500 graduates from all disciplines. Nine graduates from UCA Rochester's BA Hons CG Arts & Animation course took to the exhibition with a stand that juxtaposed early Victorian animation toys with modern CG work such as Jordan Buckner's 'The Minor Key'. "UCA Rochester's CG Arts & Animation team stand was slick but very accessible," said New Designers co-ordinator Isobel Dennis. "The way they married the charm of spinning zoetropes with the beautiful animation was inspired."

Six months of free training

WIN

The Gnomon Workshop is offering one lucky winner $250 worth of access to its library

The Gnomon Workshop founded by Alex Alvarez is one of the most respected leaders in professional training for artists in entertainment and design. Partnering with 3D Artist this issue, one lucky winner has a chance to win six months' free access to The Gnomon Workshop subscription library. The offer, which would usually set you back $250, will give you instant access to an amazing educational resource, packed with tutorials on 3D modelling and sculpting, character rigging and animation, composition and more. Head to www.thegnomonworkshop.com to discover more.

» To enter the competition simply answer is question:

Who founded The Gnomon Workshop?

Send your answer by email to 3dartist@imagine-publishing.co.uk with 'Gnomon Workshop competition' written clearly in the subject line. Include your name and write your answer in the body text. The closing date for entries is 15 October 2012. The winners will be chosen at random and announced after the deadline. The editor's decision is final and prizes cannot be exchanged for cash.

What's in next issue

Learn to sculpt intriguing alien landscapes
Issue 46: on sale 12 September
To buy your copy, visit www.imagineshop.co.uk

Inspiration corner

'Reset'

Theory Interactive sets a new standard for indie game graphics

Alpo Oksaharju www.reset-game.net

It may surprise you to learn that the astonishingly beautiful trailer for the upcoming videogame *Reset* (http://tinyurl.com/reset-debut) not only consists entirely of real-time game footage, but it also represents just ten months' worth of work from two people: Alpo Oksaharju and Mikko Kallinen.

"We were really pushed to think outside of the box," says Oksaharju. "The biggest challenge is finding solutions to create stuff with the least amount of effort. When a sticky situation arises we sit down and narrow down what we're trying to achieve and work on the essence of the problem only. We're always fighting the urge to build big fancy systems – we're reaching for an elegant system instead."

Oksaharju and "world-class programmer" Kallinen have created their own engine from scratch, as they "wanted to have a certain atmosphere that we knew we couldn't achieve with third-party engines." They've found creative ways to cut a lot of corners due to a small budget. Their advice for other small teams looking to create games with similar resources? "Have a big dream and a belt with enough holes."

"*Reset* started with a clash of our desire to make games with no-compromise visuals and a short story I wrote a few years back," says Oksaharju

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Product of the month

A MacBook Pro with Retina display

» **Apple**
Stockist: www.apple.com
Price: From $2,199
We say: Following the iPhone and iPad, Apple has updated its MacBook Pro range with a new version sporting a Retina display. The 15-inch screen comes at 2,880 x 1,800 pixels; the world's highest-resolution notebook display.

Amazingly, this increase in resolution comes at a smaller size, measuring a svelte 0.71 inches – 25-percent thinner than the previous gen. Along with all the standard stuff the MacBook Pro also packs in a quad-core CPU up to 2.7GHz, up to 16GB of RAM, a killer graphics card and up to 768GB of SSD storage.

B The Burning House: What Would You Take?

» **HarperCollins**
Stockist: www.amazon.co.uk
Price: From £8
We say: What would you take if your house was burning down? That's the question posed by Foster Huntington in this book based on the blog of the same name, and this simple dilemma opens a window into the minds of its contributors. More than a picture book, it's a study in materialism and sentimentality. What would we take? Our 3D Artist back issues, of course.

C *King Kong*: V-Rex Skull

» **Weta Workshop**
Stockist: www.wetanz.com
Price: From $40 US
We say: Let's be honest, there are few items that are going to make your workspace look cooler than a dinosaur skull, and fewer still than a V-Rex skull. Created by Weta Workshop's incredibly gifted sculptor, creature designer, prop maker and artist Jamie Beswarick, this skull comes from Weta's *King Kong*. It belongs to the powerful descendant of the tyrannosaur that does ferocious battle with the gargantuan gorilla himself.

D Can Beard Cozy

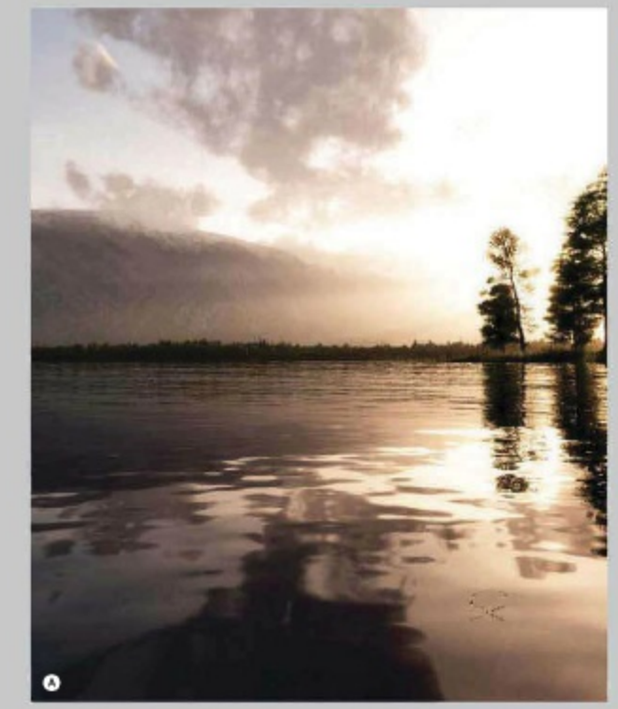
» **arms and ink studios**
Stockist: www.etsy.com/shop/armsandink
Price: $7 US
We say: Want to make your drinks feel a little manlier? Why not adorn them with a rather fetching beard? Etsy Shop owner arms and ink studios has created these incredibly fun, hirsute drink cozies to man-ify your beers, wine glasses, piña coladas or whatever other beverage you feel like adding a little facial hair to. There are few things more in fashion right now than the hipster beard – so why can't your drinks get in on the action too?

E WTHR

» **David Elgena**
Stockist: www.wthr.co
Price: $0.99 US
We say: If you too have been enduring a rainy English summer so far, this classy iPhone app will at least make your weather reportage look good. Based on Dieter Rams' ten principles of good design (innovative, useful, thorough, unobtrusive and so on) WTHR's undluttered aesthetic presents a seven-day forecast worthy of Apple devices. Easy to grasp, nice to look at and almost soothing in its simplicity, it's a winning app.

F Bamboo Splash

» **Wacom**
Stockist: www.wacom.com
Price: $79 US
We say: Want to create digital art on a budget? The Bamboo Splash has you covered. The latest in Wacom's line offers a pen and tablet for the cheaper price of $79, but still promises the same pressure-sensitive technology found across the entire range. The hardware comes with a software bundle that includes ArtRage 3 Studio and Autodesk SketchBook Express, making for a nice little package. It's currently only available in the US.



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to view the art and chat to the artists

Picture of the month

Pictures of the week

THESE ARE THE IMAGES THAT WERE AWARDED PICTURE OF THE WEEK IN THE LAST MONTH

A Last Rays
a Sylvain Chevallier
Sylvain says: "Rendered in Vue 8, no post work on this one, Photoshop just for the strip and the sign"
We say: If this scene weren't made of pixels, we'd happily jump right in. We're impressed with the flawless results of this Vue render!

B Good loft office
a Rostislav Nikolaev
Rostislav says: "Maximum confidence and a warm atmosphere... Each pot (tells) a story about how, after the purchase of the estate, life changed for the better"
We say: This colourful interior is both charming and uplifting!

C Escape
a Vallez Didier
Vallez says: "After one month without Vue here is (my latest image), hope you like it!"
We say: Vallez has achieved an incredible finish with this image; the lighting and colour palette truly help make this render a masterpiece!

D Mrs. Tulumba Modern House
a Sérgio Duarte Medeiros
Sérgio says: "A modern arch-vis for a building with spaces for offices, auditorium and meeting (rooms)"
We say: We love the impact of this incredible render: the lighting makes the building feel like a magnificent feat

Living Light Bulb
a Johan Backman
Johan says: "This project started out as a simple rendering exercise in V-Ray – it was just a light bulb, which seemed a little bit boring. I went into ZBrush and created an octopus from a ZSphere. It ended with the octopus eating the coil to gain the energy from it."
We say: So, when the filament breaks, what happens to this little fella? We'd better not to think about it – could get messy! Interesting concept, though.

Awesomesaurus
a Ariel Flores
Ariel says: "This guy started as a sketch when I was bored. I thought the little guy had real character so I decided to model him. It's one of my favourite pieces so far..."
We say: Ariel is building up a sweet collection of dinos in his portfolio. We particularly love Triceratawesome – head to 3DArtistonline.com to check them out

Powerful Engine
a Rodrigo Sória
Rodrigo says: "Crazy for extremely detailed work, I decided to develop a project to express my personal style... so I chose a model aeroplane engine"
We say: This is a fantastic render – great to see Softimage and KeyShot in action together here!

Area 52 Alien Detail
a Nikolas Lazar
Nikolas says: "This alien was created as a part of my demo reel, 'Escape From Area 52', made with Maya, ZBrush, Photoshop and mental ray"
We say: This character has a freakishly realistic pose – we wouldn't like to bump into this guy in an alley!

Community

The latest news, tools and resources for the 3D artist

Get in touch...

3dartist@imagine-publishing.co.uk

Have your say

Email, Tweet or get in touch with us on Facebook to share your thoughts, opinions and proudest projects

You tell us

Facebook.com/3DArtistMagazine

We'd all love to work on the blockbuster films, but there are many interesting areas of 3D that we forget about. Tell us what you do for a living!

Maitiú Albanach Ewing Software Developer and student

Dan Jutson I work at a new company making games on the more serious side, developing real-time training and simulations! :)

Klaire Hodgson I'm working at Gaia technologies and I make 3D lessons for schools

Allen Bussell Paradigm Marketing and Creative where we do a lot arc-viz and more

Get involved... @3DArtist

@TheRealGelfie: @3DArtist do you guys offer the CD content on your website for the digital magazine owners?

@3DArtist: @TheRealGelfie Hi there! You can grab the tutorial files from our website www.3dartist-online.com/news/..tutorial-files. Note it's not the full disc, just tut files

@Azhreicb So, latest copy of @3DArtist arrived yesterday. Looking at the work in it I can't decide if it's inspirational or just makes me depressed!

@3DArtist @Azhreicb Aww, why is that?

@Azhreicb @3DArtist The thought of whether I will ever manage to reach the matching level of awesomeness! The bar just continually rises!

@3DArtist @Azhreicb But don't lose faith! See the bar as your goal, not a defeat :)

More 3ds, please!

I do think that you have a very difficult task in trying to cover so many platforms and subjects. This said, I think a more strategic approach to platforms and subjects could be applied; as a former industrial designer there were many elements of 3D Studio I did not use that I work with every day, and I now find myself constantly unlocking new features and embedding them in the work I now do, hence why I subscribe to your publication...

So you see, I desperately want to get your magazine each month as I have quite literally fallen in love with 3D Studio again in recent years, like I did as an industrial design student.

Adrian, via email

It is indeed a mighty task, but it's a challenge we take on knowingly and we therefore always try our very best to get a good cross-section of informative and inspirational articles for readers in every issue. It is of course difficult to please everyone and to cover all the popular software on the market, but it's important for readers to let us know what they think so they can help us shape future issues.

So let's open this up to everyone: get in touch at 3dartist@imagine-publishing.co.uk to let us know what you'd like to see in the magazine. We promise not to bite!

Check out our expert 3ds Max tuition starting on pages 52 and 76.

Cover disc gripes

Today I brought the latest issue of 3D Artist and then found out that a lot of the content had to be downloaded from your site. There is no clear mention of this on the page about the CD and even the back of the CD sleeve says 'On the disc'. This should have been made clear to anyone looking at the magazine.

Stephen, via email

I'm sorry to hear about the annoyance at the downloadable content. We always aim to excite readers with extra downloadable content download from our discs – we have so much cool stuff that not even a DVD will contain it most issues. We hope that the download waits are worth the awesome tuition and assets that you'll find on our discs. Thanks Stephen!

Star letter

digital-tutors

www.digitaltutors.com is a learning resource site boasting a library of 17,000 video-based CG lessons.

THE AUTHOR OF THIS ISSUE'S STAR LETTER WINS A MONTH'S FREE SUBSCRIPTION TO DIGITAL-TUTORS WORTH $45

Have a little faith

I have been working in VFX now for about eight years, and it remains one of the best decisions I ever made! I thoroughly enjoy my working day.

That's why, when my best friend Alan recently lost his job I decided... I would teach him CG myself. He's a creative guy who has sadly never had the chance to express himself. Well, it's never too late to learn, and I wanted to ask you: In only a week he has gone from absolutely no 3D knowledge at all to modelling this lovely little room scene in Maya. Would you perhaps publish it, just to egg him on a bit?

Adam, via email

Your wish is granted! This is an inspiring story for those readers that flick through the pages of 3D Artist in awe, rather than with the determination to follow suit. We salute Alan and we wish him the very best with his next project – let him know he's now the proud winner of one month's free access to the Digital-Tutors website.

And to everyone else: take your next vacation week as a chance to learn something new. Get inspired, get creative, and get those skills sharpened!

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Electric dreams

Words by **Chris McMahon**

James Sindle, co-founder of London's eclectic new VFX company, Electric Theatre Collective, discusses the challenges faced when setting out in such a competitive environment

The Mill, Digital Domain, MPC, Framestore, Rhythm & Hues, Animal Logic – and they're just the big-hitters. If you enter the VFX post-production business today, you're entering a world of intense competition where hundreds of studios are constantly going up against one another in a battle for the biggest and best projects.

It's no easy business and only the most creative, innovative and technically skilled post-production studios are likely to make a name for themselves. That's exactly what Electric Theatre Collective studio (ETC) hopes to do. Consisting of James Sindle, Dan Marum, Lee Pavey and Giles Cheetham, ETC has been built from the ground up by four ex-operatives at The Mill, who left behind the bright lights of top-of-the-line, big-business ad production to make something for themselves.

Having already worked on recognisable projects such as Ambrosia's 'Picnic', Ubisoft's recent live-action *Assassin's Creed III* trailer, Cadbury's vans and a whole host of other projects for O2, BT, Nokia, T-Mobile and much more, ETC is already well on its way to becoming a major player just a few short months after opening its doors.

We travelled down to ETC's trendy Oxford Circus office to meet with the entrepreneurial minds working there. We discovered exactly what concoction of expertise, dedication, passion and bravery (plus a touch of madness) it takes to leave the security of big-name business behind and go it alone.

3D Artist: *Can you give us a bit of background on Electric Theatre Collective's founders?*

James Sindle: We all worked together at The Mill, mainly in the London office. There's me, Dan [Marum] – we're both 3D guys – then there's Lee [Pavey] who's producer and Giles [Cheetham] who's a Flame operator. We all worked together, although Giles and me went off to The Mill LA about three or four years ago, and we helped set up that office – we were some of the first people in that office back then. However I worked primarily in London, so that's how we all met. We'd all been there between six and eight years, so we'd done a lot of projects.

3DA: *So what makes ETC unique? What sets you apart from the other agencies in London?*

JS: Service. We provide a similar product to our big competitors, but when you come here you don't have to ring reception to be put through to someone. You get the owners. You're literally through to us straight away. Maintaining that personal level of business is important for a new start-up. You end up befriending a lot of the directors that you work with, so it's nice that they can come in here and just hang out. That's our unique selling point at the moment, for sure.

3DA: *How did things feel when you started out on your own?*

JS: It was pretty scary. The Mill is a great place to work, so leaving that security of regular income and heading into these uncharted waters is scary. It's also fun, though. We had a great time designing the ETC building – we did about three months' building work on the office. Then there was all the kind of usual stuff that comes along with setting up businesses: the paperwork and the legal stuff – that was all stuff that we hadn't dealt with before, but it was [all] good fun.

3DA: *Was creating the right office environment important for you?*

JS: Yes. First we had to find the right space, which took a few months. I saw loads and loads of offices because we were really anal. We really wanted to get the right place. The people that had this building before us – Dare Digital – they had the whole building before they had a merger. It was pretty run down actually, but we put a load of partitions in, sorted the walls, put new floors in. It's in pretty good shape now.

ELECTRIC THEATRE COLLECTIVE

A visual effects studio that prizes imagination and creative thinking over all else

Studio Electric Theatre Collective • **Location** London

Website www.electrictheatre.tv.

Expertise CGI and compositing, a dedication to VFX detail, the creative intelligence to bring subtlety or extravagance when required, a passion for ideas.

Key clients Ubisoft, BT, Nokia, Cadbury, Ambrosia, T-Mobile, O2, Kasabian

Company history ETC is the brainchild of Lee, James and Giles, each of whom was a star employee of industry giant The Mill. They have now welded together their honed talents to create a gleaming post-production machine at the heart of the film and advertising capital.

Taken from an ad for Mercedes, featuring people flying around and crashing into invisible cars

All images © Electric Theatre Collective

Contributors

James Sindle, CG artist

Past Work Drench, 'Brains'; Lynx/Axe, 'Fallen Angels'; Hovis, 'Go On Lad'.

Bio James studied design at Kingston University before training in CG at Escape Studios. Upon completion he joined The Mill in 2007. In 2009 he became joint deputy head of 3D, where he helped build and inspire the growing department.

Lee Pavey, Producer

Past Work Grizzly Bear, 'Two Weeks'; Guinness, 'Music Machine'; PlayStation 3 'Murals' and 'Rubber Johnny' with Chris Cunningham.

Bio Lee started as a runner at Glassworks when he was just 17. Later he worked as a producer at The Mill London and in 2009 relocated to the company's office in Los Angeles.

Giles Cheetham, Flame artist

Past Work Guinness, 'Best Mates'; Nike, 'The Next Level'; Lexus, 'Hello Someday'.

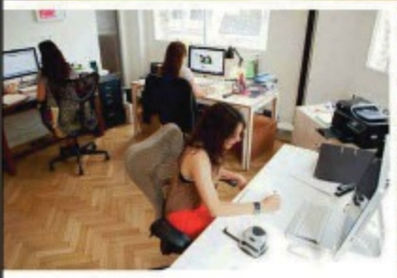
Bio Giles was a senior Flame artist and VFX supervisor for 11 years. The last eight of these were at The Mill, where he worked on numerous high-profile commercials and other projects.

Dan Marum, CG artist / lead technical director

Past Work *Harry Potter and the Goblet of Fire*; Stealth; Carlton Draught, 'Big Ad'.

Bio Dan's career began at Animal Logic in Sydney, where he quickly became a lead technical director. He has worked at The Mill's London, NY and LA offices.

What's James' favourite project? "I can't really pick one. We've done a few good things. We've done a good Cadbury ad... Giles did the Ambrosia advert, which is really funny and got some great press"



"We went for quite an open-plan environment", says James, "[though] we need a few more private areas to shoot off to when it's a bit noisy"

3DA: *When you're starting up there must be a lot of questions that need answering. Which are the most vital?*
JS: The most important thing is finding the right group of people to do it with. We feel like here it's been a good blend: we've got 3D, we've got technical 3D, there's Dan, a producer and a Flame 2D artist. It's a good combo. All of our holes are filled. I think that's a really important thing to [get] when you're setting up. Just make sure you've got the right people to create the service that you want to give. Beyond that everything else just falls into place. It's not easy, but you're in a little gang and you just work it out together.

3DA: *What was the setup here when you first opened the doors?*
JS: We started pretty small. There was the four of us, and then maybe three more. We just had a few desks and chairs and it was really echoey. Even just working out or exact positions and job titles at that point was a bit cloudy. However, as time went on, both the studio and us started building out naturally. We started off with just two machines, but as and when the jobs came in, we would just buy more machines and tables as we needed them. We wanted to keep costs as low as we could really, so it was a case of growing outwards as and when we needed to.

3DA: *How did you go about finding clients once you had settled? Did you have any specific plan of action?*
JS: We didn't have any particular plans. Like I said, the first couple of weeks we were here it was dead! However, all the people we knew started to come round to say hello and then scripts slowly started coming though the door. Because we've all worked for so many years in the industry we've just picked up friends, and that's how we've managed to get the work.

3DA: *What was the very first project you took on as a company?*
JS: The very first thing that we did was some interactive graphics for the band Kasabian. On their tour they had a huge screen dome behind them that would have all the lighting for the show and all the graphics. We did those in conjunction with a couple of people, like Silent Studios. It was good because it wasn't our usual TV advertising kind of work.

Picking and organising the right office space was essential for the ETC team

The Collective

Dan Marum gives us some insight into his work at ETC

3D Artist: ***What's your personal background in the industry?***
Dan Marum: I started in Sydney working for Animal Logic. After five years working there in TVC and Film I freelanced in London for a while at The Mill and Framestore. I then spent over two years living in the US and working full-time for The Mill in LA and NY in both CG and R&D departments.

3DA: ***What tools do you use and why? Which are the best for a start-up company?***
DM: We use a variety of tools, with the philosophy of using the best tool for the job, the list includes commercial packages like Maya, Houdini, NUKE and MARI, open-source tools and libraries like Open Grid Scheduler and Cortex, as well as proprietary tools like our own procedural crowd system. The best tools for a new company with little experience would be any tools you as an operator feel you can master.

3DA: ***What, if any, new tools and techniques have you developed while working at ETC?***
DM: We've written code for rendering procedural geometry in the Houdini Mantra renderer and some tools for crowd generation. Some Maya field plug-ins and shaders have also been developed.

3DA: ***With advertising, each project you take on can be completely different from the last. How do you keep up with the different demands?***
DM: We try not to overly specialise our skills in one area. Our artists are comfortable in multiple disciplines of CG so there is always someone in the office that can come up with a great idea to solve a problem [that arises].

> If you dwell on how many thousands, or tens of thousands of people are going to judge your work, then it might freak you out. It's best ignoring that! **James Sindle,** ETC

3DA: *Have you got a specific kind of client base that you're looking for?*
JS: Anything that's interesting to us, we'll go for. That was the whole point with that Kasabian job. It wasn't something that we've normally done in the past and it was an interesting project. Anything like that which comes our way and we think is right for us, then we'll get involved with it. We're just looking for what interests us and pushing ourselves in those directions.

3DA: *What was it like pitching against huge companies like Digital Domain?*
JS: It wasn't really like a pitch... it depends on how you define a pitch really. When a script comes through the door the agency will have a number of directors that are potential candidates to work on the script. We'll quote with the chosen director, but that director may well be quoting with multiple post houses. You have meetings with the director and he might then go to The Mill, Framestore... and then that director might just say 'Oh well, I want to use MPC', for example. So we were pretty close to winning a job, but the director decided to go to Digital Domain.

3DA: *Was it quite intimidating going up against a company of that size?*
JS: No. They do big films, but they also have a commercial department, just like The Mill has its commercial department. You can't be intimidated by that. There was a good chance that we might have got that job, but it just wasn't right for us and it wasn't right for them, so it didn't happen. If things had gone differently we might well have just won it. We can only stand out by being who we are. That's what we do.

3DA: *Do you ever feel the pressure, from both an audience and a client perspective?*
JS: I think you've got to ignore that, otherwise it'll just stress you out! You just have to go by your own expectations and hope your expectations are as high as anyone else's. If you dwell on how many thousands or tens of thousands, of people are going to judge your work, then it might freak you out. It's best ignoring that!

3DA: *How do you keep up with the different demands of each project, especially from a technical perspective?*
JS: I like getting young people in, because they often bring in new techniques. It's about getting good freelancers as well. Someone might have learned something somewhere else that they can bring to the table. You're constantly training in a field

During the interview, James paused to get out his phone and show us Dot the office dog riding around the ETC office on a skateboard

While working at The Mill, James completed a number of high-profile projects with the popular director Ringan Ledwidge, including the adverts 'Brains' for Dremch and 'Go On Lad' for Hovis

The Collective: Lee Pavey on his time at ETC

3D Artist: ***What's your own personal background in the industry?***
Lee Pavey: Prior to setting up the Electric Theatre with Giles, James and Dan, I worked at The Mill LA, The Mill London, Golden Square and Glassworks. The reason for going it alone for me was the ability to control the way we work and what people work on each project. On a more personal level it was also a challenge to see if we could do it on our own from scratch.

3DA: ***What makes ETC unique?***
LP: It really is all about level of service we can offer. As a small company we feel we can offer a more personal service, as everyone in the office is aware of what projects are going on at any one time. The other thing is having the right people working on the right projects. Anyone can buy the machines, but you need the right artists to get the best out of them.

3DA: ***What key things do you think are needed to start in this industry?***
LP: I think you need to have a really clear vision about what you want the company to be and what work you are capable of taking on. Also trying to employ the best people possible rather than just having a body in a seat is great, that way you can always stand by the level produced. On a personal level I think having supportive family and friends around you is a great start. I was also lucky enough to have business partners who I respect and are amazingly talented.

3DA: ***With advertising, each project you take on can be different. How do you keep up with the new demands asked of each new project?***
LP: We just try to watch and research as much work as possible from advertising, movies, music, art. It also helps having an amazingly talented technical director who can create bespoke solutions.

3DA: ***What's been your most challenging project with ETC so far?***
LP: I think every project has it's own unique challenges, some creative, some just logistical and some financial. From a creative point of view I would say the current project we are on has been the most challenging, we are creating a fully CG stadium filled with people as well as fully CG internal body shots, environments and bespoke particle simulations.

3DA: ***What advice would you give to those looking to start up their own studio?***
LP: Get as much experience as you can and really learn your craft before going it alone. Also try to get as much advice from people who have set up businesses before. I think the other thing is to try not to complicate the process. Keep things as simple as possible.

Work hard. Be creative. Don't be late. Create a good service. Be positive. That's it really; the rest comes with it
James Sindle, ETC

ETC has worked on a diverse array of projects, spanning live-action music videos, interactive tour graphics and fully animated television commercials

like this. I've been working in advertising a while but I'm still learning all the time: new software, new techniques, new renderers. Workflow is constantly evolving and changing. For example, we're doing some crowd work at the moment which is a first for us, so we're now developing our own crowd system. That's something we're learning and working with. New challenges like this mean you end up learning new things, and that's how you stay on the ball: reacting. It's very difficult to learn stuff when you're not doing it on the job. It's a really self-motivating thing, and quite often if you don't have direction it's quite hard to get yourself to do it. You can do as many tutorials as you like and try to do new things, but until you actually get a job that demands a certain thing, that's the only way you're really going to learn it.

3DA: *Do you do currently develop a lot of your tools in-house?*
JS: We've got an open-source platform called Cortex, and we're building a lot of our pipeline around that – I think Dan used it on *Happy Feet 2*. It's for mesh caching. We've also got a crowd procedural that can pick certain animations and shaders and randomise them at render time. So it's not in your scene, but when you render, it [suddenly] appears.

3DA: *What are your core tools and software?*
JS: We've got Maya licences and we've been using Houdini a lot recently. I'd say we probably do half Houdini and half Maya with our jobs. Maya is good because there are a lot of freelancers available. Everybody learns it and knows it, and the majority of the industry uses it. We also use ZBrush, MARI, a lot of PhotoShop and then we've got PFTrack for the tracking. That's pretty much

The Collective: Giles Cheetham discusses working with ETC

3D Artist: ***What's your background in the industry, and at what point did you decide you wanted to strike out on your own with ETC?***
Giles Cheetham: I started as a runner in 1995, moving to MCR and then to Quantel Henry. In 2000 I switched to Flame and in 2003 I joined The Mill as a senior Flame artist. The decision to strike out for ourselves had evolved over time really. There came a time when we had worked on a lot of great work at The Mill and so the next step was to work on great work for ourselves, and the challenges that come with that.

3DA: ***What are the key things you need to have when starting up a new studio, from both a personal and business perspective?***
GC: I feel the key ingredients are to set up with the right people, experience in your field and a good work ethic. Stay focused on what you want and don't stop until you get it. It's not easy leaving a large company and setting up your own, so confidence in your and your colleagues' abilities is important.

3DA: ***What tools do you use and why? Which are the best for a new company that perhaps has a lot less experience?***
GC: I use Autodesk Flame. It's the best piece of kit for a start-up VFX company, especially in the commercials environment. With high expectations and often tight deadlines, Flame is perfect. The best kit for a start-up is the kit you have already been using. You'll want to continue from where you were and progress gradually to new opportunities.

3DA: ***You've been something of a Flame expert for many years. What is it about this software that drew you to it?***
GC: I wouldn't say I am an expert on Flame. I am experienced and have worked on many complicated projects, but there are many buttons that I still have no idea what they do. I was originally a Henry op and so when I saw the flexibility and the compositing power of Flame, I knew that was the kit I needed to use if I was to produce some good work. The whole workflow and tools it had blew the Quantel stuff out of the water. Flame has its quirks but I think it's still a fantastic system.

3DA: ***How has ETC grown since you first began?***
GC: Electric Theatre has grown enormously since we opened in October 2011, not just in staff members and equipment but also in the types of jobs we are winning and producing, and the reputation we work so hard to build. With the experience we have all gained from previous companies we were confident we could produce high-quality VFX work of any size. But that doesn't happen on Day One. You have to win confidence with your clients by keeping very high standards on every job. We are now working with great directors and agencies on quality projects that any VFX house would be proud to produce.

3DA: ***From what you know now, what advice would you give to those looking to start up on their own?***
GC: Get as much experience as you can, know your s**t, then cut loose and give it a go. It's good experience.

ETC has grown fairly quickly since the company first opened its doors last year. What started as a small team of seven has now grown to 19 (plus Dot the office dog)

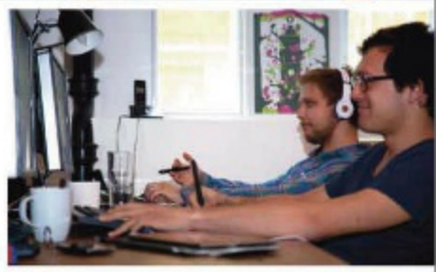
where we're at. When working we use the right bit of software for the right job. Because we're small it's easy to implement new bits of software quickly, whereas in the bigger places if you need a new renderer for a certain job, for example, it's almost impossible to implement it or get the funds to buy it. Because we're small, we're a little bit more flexible in that way. We are trying to go down a more Houdini-focused path these days, but there will always be use for Maya, for sure. However because we're so small we are definitely willing to try out new software and tools wherever possible.

3DA: *Do you need quite a flexible pipeline to deal with the demands of the different projects you're offered?*
JS: Technically we have a reasonably structured way of working. We have etiquette that we follow. As far as our 3D pipeline goes, as time goes on it's getting increasingly structured and organised. Everything is done technically in quite a nice and easy way, so I feel comfortable with that. But whatever the job needs, we work around it. We're adaptable to the needs of the job.

3DA: *You've spoken about the potential of the cloud in postproduction workflow before. Is that something you'd be interested in?*
JS: We're looking into that for rendering, but it's a couple of years away yet as there are quite a lot of issues. For one you have to be pretty organised internally before that can happen, because you're constantly uploading and downloading stuff, so there are limitations. We're limited by our bandwidth and our file sizes are huge, so that's a problem. Security is a problem as well and then there's licensing. There are all sorts of obstacles, which is probably why people haven't totally given themselves over to doing it yet.

3DA: *If those obstacles were overcome would using the cloud be a much more beneficial way of running the business?*
JS: I don't know. It feels like, for rendering, it would be more like a red button scenario. I think we want most of our rendering power in-house, but at times when we need any emergency 200 machines or whatever, then that's where it would come in. But until it's totally sorted we [won't] be using it.

3DA: *Finally, what's the best bit of advice you could give to anyone looking to start up their own post studio?*
JS: I had my own company about eight years ago, but I just didn't know enough people and as such I didn't have enough contacts. Really this is the second time round for me, and this time I do have those contacts. It's about picking the right time. It's got to be the right time, and from there just work hard. Be creative. Don't be late. Create a good service. Be positive. That's it really, the rest comes with it.



"You could always do with more time, but strict deadlines are just the way it is," says James of post-production in advertising

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GET AN ONLINE EDUCATION

Want to learn your craft, get a recognised course on your CV and not leave your hometown? Simple, just sign up to learn online Words by **Poz Watson**

The idea of getting an education may come complete with visions of lecture halls, early-morning seminars and cheap booze, but the truth is that more and more people are now learning their craft from the comfort of their own homes. Of course, everyone can learn from forums, the odd free online tutorial and magazines like **3D Artist**, but if you really want to make or radically change your career, you need something a bit more full-on.

> To make or radically change your career, you need something a bit more full-on

Lisbon-based Ricardo Viana already had a degree in Industrial Design when he decided he wanted to learn VFX. He explains, "3D classroom courses in Portugal are more dedicated to architectural visualisation and industrial design using 3ds Max, AutoCAD or SolidWorks." Studying with Escape Studios in London appealed to him, but he "already had a wife, child and a full-time job as a motion designer and just could not afford to go to London."

When Escape (www.escapestudios.co.uk) launched its online mentored VFX course, he was one of the first to sign up, because "it was my chance to learn from the pros while staying at home," as he puts it.

Lou Sgarbi is another 3D artist who has taken the online route. He was on a placement for a conventional university degree when the rise in tuition fees came in, making it impossible for him to finish. Fortunately, his employers took him on full-time and he signed up for Digital-Tutors (www.digitaltutors.com) so as "to help top up my education after hours."

If you go down the online route, you have to be disciplined. "Let me just say that these lessons and exercises are very intensive," says Viana. "It's not something you can take lightly. I had to work every single weekend for a year in order to get all assignments done. It's hard work but is also very rewarding." Like anything else in life, you get out what you put in.

Classroom versus course

While for some online is the only option, for others it could be a coin toss. So which is best if you can take either route? "While going to a physical school to learn VFX has many advantages," says student Diamond Wheeler, "I don't have the time or the money to take one to two years to study there."

"It's always nice to have direct access to an instructor in person," admits Gnomon Workshop tutor Mark DeDecker. "But, online offers the ability to do things in your own time. In person, once the class is taught it's taught and you go home. Online you can re-watch the lessons." Ricardo Viana recommends online training to "those who can't get classroom [courses] nearby or have a full-time job with incompatible hours. It's a good alternative. Though I recommend intensive classroom courses if you want to get there quicker." The Art Department (TAD) tutor Brett Briley notes that "a traditional classroom setting allows for more social interaction; however, it limits who can participate. Online classes allow me to teach students from around the world without regard for time zones, scheduling conflicts and location issues. The flexibility of online classes enables students to benefit from the instruction of some of the most talented individuals in their fields without leaving the comforts of their homes. TAD's impressive array of talented instructors offers students an education they can't get anywhere else."

© Alejandro Torres

Image by Richard Yuill, www.itchy-animation.co.uk

In association with ESCAPE STUDIOS

> Online classes allow students to go at their own pace and work through the classes a few times if they need to, which is something you can't do in a live classroom — **Noah Vice**

THE RYDAN WORKSHOP

For pro advice and feedback, **www.therydanworkshop.com** is one of the best places to go

The Rydan Workshop offers a range of courses, including Game Character Pipeline, Introduction to ZBrush and Real-Time Environments with Unreal Engine, which student Luke Adwick took. Rydan uses weekly live-streaming video as an interactive classroom, where students can fire back questions and hear fellow students' advice.

Adwick explains: "The course was completely based online. We met once a week with the instructor where we attended a two-to-four-hour live class [and] Chiyo Lai, our instructor, would follow a loosely planned schedule, with as much room for us as students to drill questions and advice. We had an ultimate goal to finish a 3D environment covering the fundamental aspects to getting there. A private forum was also provided for us to show progress and get feedback from the Rydan staff." Courses are generally eight or ten weeks long, and prices start from around the $400 mark.

VFX LEARNING

If you want to learn pro-level VFX then you should check out **www.vfxlearning.com**

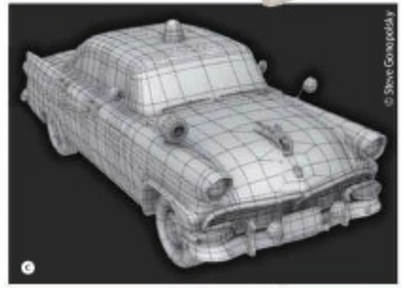
VFX Learning is currently aimed at people who work or want to work in film, but there could be a games-orientated course coming very soon. At the moment the site offers different courses in Maya, Houdini, Naiad and NUKE. Prices and course lengths vary, but the Maya Dynamics Level 1 costs $1,500 and takes 12 weeks.

Diamond Wheeler, who is currently studying with VFX Learning, explains how it works: "We use a program called Adobe Connect and it basically sets up a digital classroom where we all meet to discuss our projects or to start class. We can connect via webcam and have the ability to talk to one another via microphones. Then we also have a message board on VFX Learning where we post questions and our work-in-progress pictures."

A *Belial* was created by TAD 3D tutor Brett Briley for *Dominance War 4*

B The wooden door in this scene is part of the work that Alejandro Torres shows at his tutorial site **www.archv4d.com**

C Steve Gonopolsky's skills increased greatly after learning from The Art Department; this car is one of the results of his progress



D Ricardo Viana re-created a vintage catalogue shot of a Citroën as a polygon modelling exercise

E This concept sculpture is something Mark DeDecker is creating in ZBrush for an upcoming Gnomon DVD

Polish your portfolio

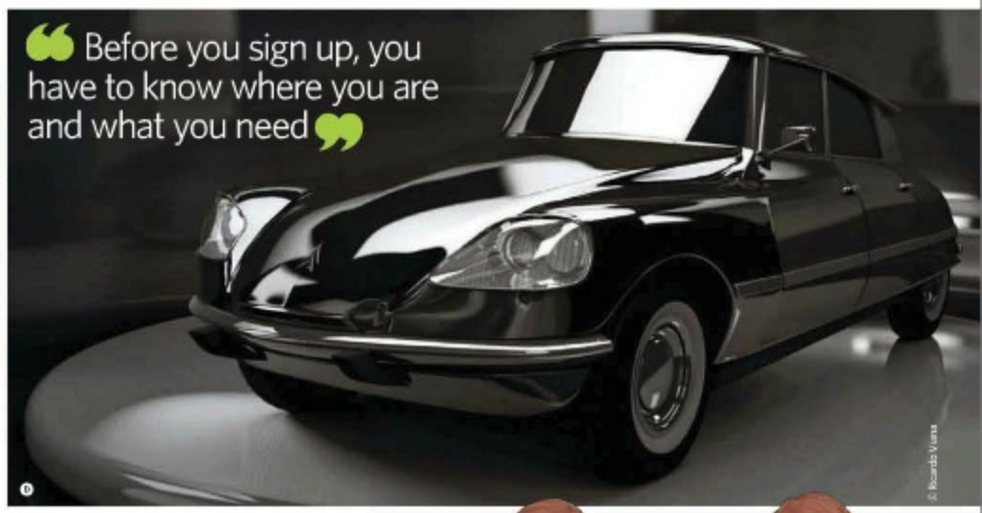
If you're coming to the end of education, then it's time to get thinking about the job market. However scary a thought that is, there are jobs out there. If you have the talent, the qualifications and the attitude, then all you need to do is present that combo to the people that matter. That means a professional portfolio or reel.

CGWorkshops tutor Noah Vice says: "The head of a television commercials company once gave me some good advice when I was starting out that has always stuck with me: 'You're only as good as your reel.' After you have spent the time accumulating the knowledge and skills, you really need to put a good deal of time [into] presenting them. You have to show the people that are interviewing you that you are at their level, and make them want you working alongside them."

To show you can be a professional, you have to act professional. Presentation matters, spelling matters, people's names really matter. But what's most important is what your reel contains. As Gnomon Workshop tutor Mark DeDecker explains: "The difference between a professional and an amateur is that an amateur shows all of their work and a professional only shows some of their work (the good stuff). Have a large body of work so you can choose what you want to show."

Hopefully, your courses will help you create a large body of work. Brett Briley says of his TAD course: "Students are required to work on creating proper sheets for their portfolios that cover the high-poly assets, low-poly assets and a texture sheet for each piece. This process creates a template for potential employers to see how a piece was created and how final results were achieved."

But it doesn't matter how good your portfolio is if you don't get it – and your name – out there. DeDecker advises his students to "post on forums, be visible and network. The more people you know the better your chances of a prospective employer recognising your work. We all visit the various CG forums!"



LEARN GAMES FROM THE PROS

If you want to make life-long friends or get a rounded, considered approach to your subject, then university is great. But, with so many students to cater for, it isn't always the best for getting the practical, immediate advice or the contacts that will get you a job.

"I signed up for the Rydan Workshop Real-Time Environments with Unreal Engine program towards the end of my final year at university studying Games Design," explains Luke Adwick. "I was at a stage where I needed to get my portfolio in gear. This course offered a perspective of development from an environment artist who was currently in the industry [and] my university didn't offer the level of interaction that I so desperately craved." Adwick chose his Rydan Workshop course (www.therydanworkshop.com) carefully, to practise what he hoped one day to be doing professionally.

"The goal was to create a section of an environment in the Unreal Engine 3 for modern games," Adwick explains. "We went through all the stages and processes an environment artist takes to achieve such a task. Discussions [included] modularity, level design and grey boxing levels."

Brett Briley works full-time at id Software and teaches a 3D course for The Art Department (TAD), www.theartdepartment.org. He focuses "class time on the following programs: 3ds Max, ZBrush, Mudbox, Photoshop and various game engines. 3ds Max is the main modeling program examined and I focus on how to break down the basics for good topology flow, how to create an asset correctly and quickly, how to create high-/low-poly [assets] and UVing [as well as] how to create the maps needed for a game engine."

The crucial thing to realise before you get carried away is that there are various types of online training and they fulfil vastly different needs. In some cases you are buying tutorials, or a subscription to lots of tutorials. Others are proper courses, with a tutor, peers and feedback on your assignments. Some last the eight minutes the video does, others eight weeks, others two years. Before you sign up, you have to know where you are and what you need. Diamond Wheeler, who is studying with VFX Learning (www.vfxlearning.com), explains: "A lot of the time these courses make you go through base modelling and texturing and things like that before you can really dive into the dynamic systems. This class didn't, and I really liked how it focused entirely on creating VFX inside of Maya at a professional level." Industry-level contacts are another crucial benefit, as taught courses should be [conducted] by working artists. Wheeler adds that his tutor, Luis Pages, "is an industry professional with direct connections to others in the VFX world. Getting a chance to work and learn from a guy who worked on VFX blockbusters such as *Avatar* [and] *Harry Potter*... was an opportunity I couldn't pass up."

ESCAPE STUDIOS

If you want accreditation that the film industry will really value, look no further than **www.escapestudios.co.uk**

Escape Studios has a sterling reputation in training CG artists for film, and it runs evening classes as well as intensive classroom courses. Since last year it has offered people who don't live in London the chance to get in on the act too, with both online self-directed courses (on various topics) and online mentored courses in VFX and compositing. Since last January, it has already had 150 students from 33 countries enrol.

Ricardo Viana took the mentored VFX course while living and working in Lisbon. He explains: "There were pre-recorded lesson videos structured by software and per week. At the end of the week we had assignments that were supposed to use the techniques covered in the lessons. The tutor would then record a video for each student, with their exercise, and explain what they did wrong or right. Sometimes if you [went] beyond the exercise a bit, they would give advice on other more advanced topics." The mentored courses cost £7,000 and take around 40 weeks to complete.

GNOMON WORKSHOP

You know the school, now you can find the online offerings at **www.thegnomonworkshop.com**

The Gnomon Workshop is a library of tutorials that you can buy access to for $499 a year. New tutorials are added every month, each and every one created by an industry professional. Most of the tutorials fall into the bracket of digital production (everything from character animation to matte painting) but there are also more general topics (colour theory and storyboarding) and tattooing lessons too.

As artist/instructor Mark DeDecker explains, although there is no element of feedback directly involved, it is possible to get more involved with Gnomon: "We have a lot of events at Gnomon. Come see and get to know us, start networking! Most people are gracious and helpful when asked by students for feedback. The other way would be to enter the competitions we have and post to the forum on the workshop. Occasionally regarding DVDs, instructors will give their email for feedback."

A This is an in-game screenshot of the Den environment Luke Adwick created for UDK at The Rydan Workshop

B Based on Boston's red brick architecture, this is a piece of Lou Sgarbi's personal work

GET THE CINEMA SKILLS FOR THE JOB

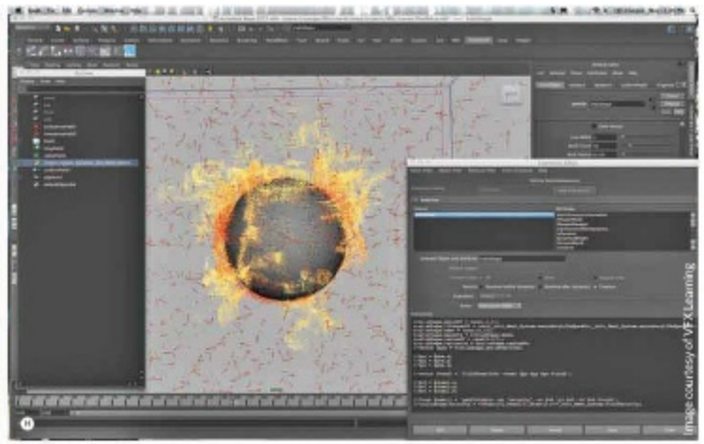
Before Escape launched its online mentored course, Ricardo Viana was teaching himself VFX with the help of online tutorials and books. "But the thing is," he explains, "when you try to learn on your own, at some point you start to lose focus. You start wondering, with all those tools out there, which path [you should] take. At some point I read and watched pieces of documentation for almost every professional software available. Then I came to the conclusion that I knew a bit of everything but wasn't really good with at least one package." The Escape course took him through "a graphics primer for newcomers to computer graphics, Maya (modelling, UV layout, texturing, lighting, rendering, basic rigging, animation), [an] intro to film theory, PF Track (camera and object tracking), MatchMover (camera tracking), ZBrush, NUKE (multipass compositing, camera projection, rotoscoping, linear light theory) and Photoshop." It was a lot of hard work, with lesson videos organised by package and topic. "During the week we could seek advice and support on the learning system where Escape Studios tutors would give a really fast answer to your questions. There we could interact with other students and share stuff like in a social network way, share pictures, messages and scripts," he adds.

> "You start wondering, with all those tools out there, which path [you should] take" **Ricardo Viana**

Diamond Wheeler spent two years teaching himself Maya before signing up for VFX Learning: "The Level 1 course I am taking covers the basics of setting up a VFX system or shot in Maya. We began by talking about emissions and particles and quickly advanced into creating some amazing things.... We went from setting up particle systems to simulating galaxies to writing MEL scripts to control particle emissions based on what type of geometry the particle collides with. We [went] into particle goals and soft body simulations, and then Luis [gave] us real-world examples of how he used them in a movie he worked on. This... is where I learned the most. Some of these tutorials and classes teach you about the general way to set up a goal or an instanced particle, but that's it. They don't say anything about applying it to a real-world situation, which in turn helps me learn and understand the effect much better."

Wheeler is still doing his course, but Viana's has already made a massive difference. Before Escape he was a motion designer, and now he's a VFX generalist at Bikini, a post house in Lisbon, and "doing CG work for TV commercials and films." Putting The Rydan Workshop on his CV has helped Adwick's career too: "Without it I'm not sure whether I would have landed a job straight out of university. [The opportunity to spend] time with an experienced artist gave me the knowledge and confidence to develop a strong enough portfolio piece."

C Based on Boston's red brick architecture, this is a piece of Lou Sgarbi's personal work



D Maya is one of the programs that students of Luis Pages and VFX Learning use

E Luke Adwick is certain that having the Rydan Workshop on his CV has helped his career greatly

F Alejandro Torres created this lounge image in 2009, as part of the tutorials on his site www.archc4d.com.

G Brett Briley leads TAD's 3D course, covering all the basic but essential skills

ARCH-VIS OPTIONS AND FEEDBACK

There isn't as much training out there specifically for architectural visualisation, compared to how much there is for games or film. But 3D students seeking to make a career in this area can still find things of interest – you just have to look beyond the titles and delve deeper into what a tutorial actually covers. The big subscription sites – like Digital-Tutors and CGWorkshops – have a wealth of material that you can learn from. Alejandro Torres set up his site www.archc4d.com in 2009, after creating some tutorials and receiving good feedback on them.

Torres is a big fan of online learning, commenting that "the things you can't learn with online tutorials – or even traditional training – are mostly business related. Selling your work and talent is done with experience and real-life projects; the things learnt there are much more valuable than any tutorial can teach you." Since he started selling his tutorials, his customers have started sending him their CG renders and asking for feedback, "or ways to improve [them]. At some point I was a very active member of an online CG community and would give feedback there, but now I do it via email."

Feedback is the difference between a simple tutorial and a fully-fledged course. Both are centred around a video teaching something, but no matter how good the tutorial (or how well-structured a series of videos forming the tutorial can be – as with the Digital-Tutors collection) everyone can benefit from individual feedback.

Wheeler's tutor at VFX Learning "delivers feedback in nearly every way possible: we meet face-to-face two to three times a week in our digital classroom; we talk on the message boards 24/7; he responds to emails as soon as he gets them; Luis is almost always available on Skype to chat with and he was even going to send me a handwritten note outlining my progress in the class." The back-and-forth is the basis of the learning relationship and most courses break down into weekly lessons. At TAD Brett Briley does this, as he explains: "Prior to class each week students are required to submit props that they have been working on. During class, I review each student's submission and offer critiques, technical assistance and shortcuts that would enhance their work and shorten the time invested. This process enables all students to benefit from each individual's submission and creates a more interactive classroom experience."

Applying for online?

While, of course, anyone can subscribe to the websites that offer video tutorials with no feedback, some online training options do have an application process in the same way that a university course would. TAD, with its course that lasts 30 months, is just one example. Brett Briley counsels: "Applying to The Art Department is quite easy. Access to the application is available on the website and can be filledin online (www.theartdepartment.org). A submission of ten images of artwork is required for acceptance and for the scholarship committee to review."

Briley continues: "Scholarships are compartmentalised to allow applicants at various stages in their careers and development to be eligible for consideration. Scholarships are awarded within each area of focus and are based on portfolio evaluation... Those who have not yet attendeda post-secondary institution will need to submit an official sealed high school transcript and diploma or equivalent documentation (such as GED certification)."

Other courses – take Escape Studios and the Rydan Workshop for instance – do not necessarily have formal entry requirements, but they do expect people to at least be computer literate and have a basic working knowledge of 3D applications. Some courses are aimed at higher levels than others, of course, so just make sure you're choosing training that fits your current capabilities – as well as your desired ones – before you hand over the cash!

ARCHC4D

Interested in arch vis and CINEMA 4D? Look no further than **www.archc4d.com**

Alejandro Torres set up ArchC4D back in 2009. He explains: "In the beginning it was just for fun. I created some image-based tutorials for an online CG community and received great feedback on them, so I figured doing video tutorials would be the next step." Then he "created some free video tutorials... and to help out with the server costs, eventually got to make a longer, complete series for $20."

At $20 the price is very reasonable and for that you can learn a lot about CINEMA 4D and arch vis. Growing knowledge from tutorials is exactly how Torres got started himself. All of his CG skills are "self-taught", he explains: "When I was most active I learned a lot from other people's tutorials, asking and answering questions in forums and online communities. Couple that with lots of hours of experimentation and personal projects and you will soon start becoming very proficient in any software package you want."

CGWORKSHOPS

Want an eight-week burst of intense training? Then try **http://workshops.cgsociety.org**

The workshops run by the CGSociety cover an astonishing range of topics, including Writing Shaders for RenderMan and mental ray, Becoming a Better Artist and Iconic Heroine Design and Creation. Although most of the topics are aimed at those heading towards the film or gaming worlds, there is plenty that could be applied to other types of 3D image creation. Courses generally last about eight weeks and cost around $600. CG supervisor and instructor Noah Vice explains: "Each week the students are provided with a series of short video lectures with a focus on a specific topic. This is followed up with a weekly assignment that incorporates what we have covered that week to help fortify the skills we've covered. The students then upload their completed projects and I give each student feedback on their work."

ESCAPE STUDIOS

THE ART DEPARTMENT

Known as TAD, the site calls itself "the next-generation model for art education"

Students can opt to study purely online, or visit the nearest TAD workshop for biannual courses. TAD takes 30 months and during that time students take a variety of courses to improve their digital and traditional art skills. When Brett Briley was asked to develop the 3D side of the school, he was delighted to be part of "an art school that really focused on creating talent and job placement." He doesn't live near any of the three TAD workshops, so teaches from his home office. He explains: "We use a program that has been orchestrated to meet the needs of the TAD online courses. The program allows students to view my work space on their personal computers and to listen to my lectures as I demonstrate different techniques and tools. Questions can be asked and work can be exchanged through the program as well. All classes are recorded in order to allow students and faculty later access." Classes can be paid for individually, or you can pay $30,000 up front to study full-time.

DIGITAL-TUTORS

Covering the whole gamut of creative software, there's a lot to learn at **www.digitaltutors.com**

Digital-Tutors also offers a whole heap of tutorial goodness for a monthly subscription fee. The cost for a solitary month is $45, but this drops to $33 per month if you sign up for a year. The site's videos have been viewed almost 20,000,000 times since 2009 and the site has over 120,000 members. An average of 70 new hours of training is put up every month, with all software from After Effects to ZBrush being covered. However, all that choice can be overwhelming and subscriber Lou Sgarbi notes: "It's probably good to have a rough idea of what particular skills you'd like to improve before you start (texturing, compositing, modeling, rendering). I felt my interior rendering was lacking so I dived right into a step-by-step mental ray lighting guide."

Lou Sgarbi made a tank to demonstrate a custom 3D service for creative agency nerv. "What digital agency wouldn't want a PZ1B as its company car?"

© Lou Sgarbi

TRANSFER YOUR 3D SKILLS

Tuition rises forced Lou Sgarbi to miss the final year of his degree, so he has "at times, felt a bit behind." But being a Digital-Tutors subscriber helped bridge this gap. He is now a junior 3D developer at creative agency nerv, working mainly with "product renders (CAD, engineering, prototypes)" while also "helping out whenever I'm needed with the ongoing task of designing the mascot for the 2014 Glasgow Commonwealth Games."

For him, the real value of online training showed when nerv needed him to create a high-poly mascot suit, as he goes on to explain: "Within the week I had hammered through about 25 hours of ZBrush training through Digital-Tutors, and an extra ten through other sources. Within two weeks Digital-Tutors and other sources had helped me create a stylised cartoon character to real-world scale, something which I had previously never done."

Although he is familiar with a lot of the programs covered, the quality of the tutorials was such that "it was still great for picking up the extra nuggets of info that had eluded both myself and my university lecturers."

If you're looking for a job in one of the commercial branches of 3D – illustration, say – then you might well be after a course or a service that can offer you underlying art advice, as well as specific program pointers. Noah Vice, who recently did VFX for Marvel's *The Avengers* at Evil Eye Pictures, but who also teaches for CGWorkshops (http://workshops.cgsociety.org), believes in the importance of both. He comments: "Traditional skills like painting and drawing that require instruction during the process may still benefit from being taught in a traditional environment. However, I think computer-related subjects do lend themselves to an online platform. Often it takes repeating a few steps in a software package a number of times before it sticks and you form what some refer to as muscle memory. Online classes allow students to go at their own pace and work through the classes a few times if they need to, which is something you can't do in a live classroom all the time."

But whether it's character design, colour theory or CAD packages you want to learn, the secret is to keep yourself open to new knowledge and new techniques. Despite his full-time teaching and part-time freelance work in the industry, Mark DeDecker still watches others' tutorials. "In fact", he says, "I'm taking two classes right now, even though I'm teaching five classes and working on another DVD. The minute you stop learning or think you don't have to learn any longer, you are dead in the water."

> "The minute you stop learning or think you don't have to learn any longer, you are dead in the water"
>
> **Mark DeDecker**

Mostly done in ZBrush (with a little help from Maya and mental ray), this character was created with reference to an actor's head, which was then transformed and textured by Ricardo Viana

This woman and creature combo sculpt was created by Mark DeDecker for an in-class demo held at Gnomon School

THE VFX FESTIVAL

The Visual Effects Festival is a five-day spectacular exploring the breath-taking world of visual effects. The festival will inspire, inform and take you behind the clever trickery and mind-blowing magic of this booming industry.

Packed with respected VFX legends & companies who have shaped the industry there'll be insider info, showreel demos, hands-on workshops and exclusive premieres, showcasing some of the greatest visual effects talent in the UK.

thevfxfestival.com

ESCAPE STUDIOS

Official Festival Sponsor: Autodesk

FRAMESTORE

Image Courtesy of Framestore & Warner Bros.

ESCAPE STUDIOS

THE VISUAL EFFECTS FESTIVAL

A festival for the future stars of visual effects, 10-14 October 2012

Image courtesy of Framestore and Warner Bros. Pictures A

A five-day spectacular exploring the breath-taking world of visual effects, The Visual Effects Festival will inspire, inform and take you behind the clever trickery and mind-blowing magic of this booming industry.

Celebrating a decade of excellence in UK visual effects, as well as Escape Studios' tenth year of training the brightest talent around the globe, the festival will be packed with respected VFX legends and companies who have shaped the industry. With insider info, showreel demos, hands-on workshops and exclusive premieres, the festival will showcase some of the greatest VFX talent in the UK.

Officially sponsored by industry software giant Autodesk and supported by post houses The Mill, Framestore, Cinesite, Pixomondo and many others, The Visual Effects Festival offers bucketloads of knowledge and expertise in one place. Whether you're a fully-fledged professional looking to broaden your network and increase your knowledge, or just starting out and want an introduction to the industry, The Visual Effects Festival is the place to be!

THE TALENT BEHIND THE MAGIC

Illustrating just how glamorous, exciting and thriving this industry is, the festival will delve behind the magic you see every day. Visual effects can be found everywhere, but for many it's still an enigma and a contradiction; seen and loved by millions, understood and appreciated by few.

Founder of Escape Studios and The Visual Effects Festival, organiser Dominic Davenport explains: "With the release of films such as *Avatar* and *Prometheus*, where visual effects dominate the screen, the industry is being brought into the limelight and becoming more of a household name. The Visual Effects Festival will reveal some of those mysteries – a hub for like-minded people, it's a place where you can find out more and make crucial and informed decisions about your own career". Visit www.thevfxfestival.com for further info.

THE VISUAL EFFECTS ACADEMY

If you have the drive, ambition, creativity and a passion for captivating an audience with visual trickery, then the Visual Effects Academy can give you the rest. Escape has been nurturing and watching its talent become an integral part of the industry for over ten years. There's really no better feeling than watching students realise their dream, making it a reality as they go on to become respected figures within the industry. Escape's studio classroom courses are intensive, there's no doubt about it. But they get you to where you want to be. Whether that's studying compositing or VFX, from the ground up or advanced level to professional, Escape can give you the skills you need to make it happen!

VIRTUAL VFX ACADEMY

For lots of reasons, sometimes it's just not possible to study at Escape's UK headquarters. This is why its online academy is the perfect alternative. You'll gain production-ready visual effects skills from home, part-time, from wherever you are in the world. With dedicated tutors ready to guide you through your weekly assignments, as well as the ability to interact and share work with your fellow classmates, by studying online you can finally achieve your aspirations from the comfort of your own home.

CASE STUDY

FROM ESCAPEE TO THE DARK KNIGHT RISES

Nik Illingworth: Technical director at Double Negative

Nik Illingworth was technical director on *The Dark Knight Rises* and it was by no means an easy feat. One of his most challenging roles yet, he enjoyed every minute crafting the dark visual magic. But how did he get to where he is today?

Illingworth always knew he wanted a career within the visual effects industry. After securing a degree in Computer Animation he decided to take his skills to a more professional level and incorporated the Visual Effects Professional course at Escape Studios into his university summer break. Through this, he acquired all the software skills he needed to start work right away, including Maya, NUKE and ZBrush. After securing a position at Framestore, Illingworth was appointed effects technical director at The Moving Picture Company, grabbing a multitude of titles under his belt, including *Clash of the Titans*. He has also graced the small screen with the Cadbury's Spots vs Stripes campaign and Evian's 'Baby' TV ads.

Nik Illingworth is giving a top-secret online webinar exclusively for 3D Artist readers! Sign up for info and to obtain your password to attend at www.escapestudios.com/nik.

Image courtesy of Framestore and Warner Bros. Pictures

Frameestore has contributed to many of the ambitious VFX shots in the Harry Potter franchise

Discover a free webinar by Amy Cuthbertson describing how the gilded mirror in *Snow White and the Huntsman* was tracked – don't miss it: www.escapestudios.com/snowwhite

Snow White and The Huntsman from The Mill © Universal Studios B

ESCAPEE WALL OF FAME

Free tutorials, webinars and a little bit of gold dust

In the run-up to the festival and to celebrate some of its most successful graduates, Escape is rolling out the red carpet by building an Escapee Wall of Fame. Working at some of the largest post-production houses on some of the biggest films and commercials around – including *Snow White and the Huntsman*, *Game of Thrones*, *Gravity* and Evian's 'Baby' – the graduates are doing Escape proud. They'll be discussing what they're working on now and sharing knowledge and expertise in a series of free tutorials and webinars, as well as appearing at the festival itself to take you behind the scenes and reveal some of that magic!

Images courtesy of Framestore

> "The Escape Studios initiative, creating this great festival is important for celebrating the excellence found in the VFX community"
>
> **Sir William Sargent,** Framestore's CEO

C

MAYA WORKSHOPS

Official sponsor of The Visual Effects Festival, Autodesk is synonymous with the world of visual effects. A world leader in 3D design, engineering and entertainment software, Maya is the 3D software of choice, used by millions around the globe. Autodesk will be delivering Maya workshops and giving out lots of freebies throughout the festival so make sure you register now. Places are limited so sign up to avoid disappointment! Visit www.thevfxfestival.com.

A Framestore was one of only a few VFX studios to work on *The Dark Knight*

B The Mill is one of many companies that takes on successful Escapees

C This TV spot took director William Bartlett and his team three and a half months to complete

CASE STUDY

SNOW WHITE AND THE SUPERMARKET

Amy Cuthbertson: Head of tracking at The Mill Film and TV

When the end credits rolled at the first cinema screening of *Snow White and the Huntsman*, Amy Cuthbertson beamed. This, for anyone striving for recognition in the industry, is the epitome of making it. Now at the very top of her game with a BAFTA under her belt, Cuthbertson is a key creative at The Mill.

Originally, Amy wanted to be an animator until her dreams were thwarted. Feeling a little disheartened, she found herself working in a supermarket. Unwilling to give up – and after some serious research – she discovered the secret to becoming a great VFX artist: passion, which she had by the bucketload.

Since then she has worked on *Harry Potter and the Deathly Hallows: Part 1*, *127 Hours* and *Clash of the Titans* and was MatchMove supervisor on *Snow White and the Huntsman*. Escape, while admitting being the bearer of a cliché, adds: "It really is a bit of a fairy tale!"

FRAMESTORE GIVES ADVICE FOR THE PERFECT DEMOREEL

Do you struggle to know what to put on your showreel? Should you show a model in its various stages? At the point of texture? Once you've lit it? When it's been fully rendered? The truth is there's an unwritten code when it comes to preparing a showreel: it's your visual CV and it reflects who you are, your capabilities and your potential. If you don't wow in the first ten seconds, you'll be put to the back of the queue.

During the festival some of the top post houses are going to be giving workshops and advice on how you can fine-tune your showreel. Framestore will be giving a live showreel critique for professionals and amateurs. If you can't wait, check out these key demoreel tips from Framestore's recruitment team, Anna Swift and Celine Beunier:

1. Keep it short. It's age-old, but any longer than one minute and you're in danger of putting people to sleep. The snappier the better!
2. Only put in work you'd want George Lucas to see. It sounds dramatic, but would you really want him to watch three minutes of a gnarly robot in a T-pose?
3. Think about tailoring your reel. Depending on the role and company you're applying for, you should add and take out bits depending on the relevancy. Your showreel is like a CV and cover letter in one – you're aiming to please.
4. T-poses are Eighties – be inventive, don't just show the work you've created in one position, spinning around. Think outside of the box!
5. Leave on a high note. You should always leave the person watching your reel wanting more.
6. Include a showreel breakdown with your reel.

PARANORMAN ACTIVITY

ParaNorman marries traditional sculpture and drawing with CG modelling and 3D printing to create a level of facial expressiveness never seen before

Words by **Michael Burns**

The biggest production ever to be made in stop-motion animation, *ParaNorman* is only the third such movie to be made in stereoscopic 3D following Laika's *Coraline* (2009) and Aardman's *The Pirates! In an Adventure With Scientists* (2012).

"*Coraline* really showed me generally what a great marriage stop-frame and [stereoscopic] 3D are," says director Sam Fell. "Creating a dimensional window into this beautifully hand-crafted, tactile world invites you in to savour the world even more than ever."

> "We... use Maya to design and engineer the face replacements and their elaborate internals"
>
> **Brian McLean**

The two years of production on the film took place at the Laika studios located in Hillsboro, Oregon, in a 151,140-square-foot building space. By August 2010, with a crew of over 320 designers, artists, animators and technicians, there were 52 separate shooting units working at almost any given time during the shoot. The 3D rigs each featured a Canon 5D Mark II camera, programmed to shift left and right on a slider, shooting separate frames for each eye. The cameras had to be replaced during the lengthy shoot, requiring multiples – just like so much else in the production.

It sounds like a logistical nightmare, but Fell reveals that the whole film was storyboarded and cut to a soundtrack mix of dialogue, music and sound effects with an editor. "This takes about a year and is a way we directors can try out lots of different ideas quickly and cheaply," he explains. "Since there are two of us it's an invaluable way of forging a cohesive cinematic approach to the film in [an environment that was relatively free of pressure]. It was important to both of us that we didn't confuse the 300-strong crew by contradicting each other. With the production designer and the DP we spent at least six months working on concept art for

> "I... loved the extra subtlety we found in the characters' expressions; it's a sophisticated story and we needed the animation to deliver a broad range of emotion"
>
> Sam Fell

3D PRINTING TIPS! Check out the tutorial on page 90

All images ©LAIKA, Inc

Meet the makers

Sam Fell
Role Director
Duties Directed the film alongside writer/director Chris Butler
Favourite character Couldn't decide!

Chris Butler
Role Writer/director
Duties Wrote the original screenplay and directed the film alongside Sam Fell
Favourite character Chris has a soft spot for Norman because a lot of the character comes from him

Brad Schiff
Role Animation supervisor
Duties Led the animation development of the characters and ensured the style and continuity of the animation stayed consistent throughout
Software used Dragonframe Stop Motion
Favourite character Mr. Prenderghast

Brian Van't Hul
Role Visual effects supervisor
Duties Oversaw the digital gurus that complement the work the stop-motion experts do on stage
Software used Maya, RenderMan, Silhouette, NUKE, 3DEqualizer, Shotgun
Favourite character Bub the dog

Brian McLean
Role Creative supervisor
Duties Led the hugely talented team of over 40 CG artists, animators, engineers and texture painters
Software used Maya, ZBrush, Photoshop, TopoGun
Favourite character Alvin – a funny and challenging character!

A The rapid prototyping process generates different facial expressions for Norman. "It helped our characters become even more alive," says creative supervisor Brian McLean

B While Coraline Jones had well over 200,000 potential facial expressions, Norman Babcock has 1.5 million – enabling a seemingly limitless variety of smiles, frowns, winces, and screams

C Animation supervisor Brad Schiff adjusts one of the zombies for his close-up in *ParaNorman*, the new 3D stop-frame comedy thriller

Focus Features and Laika's ParaNorman

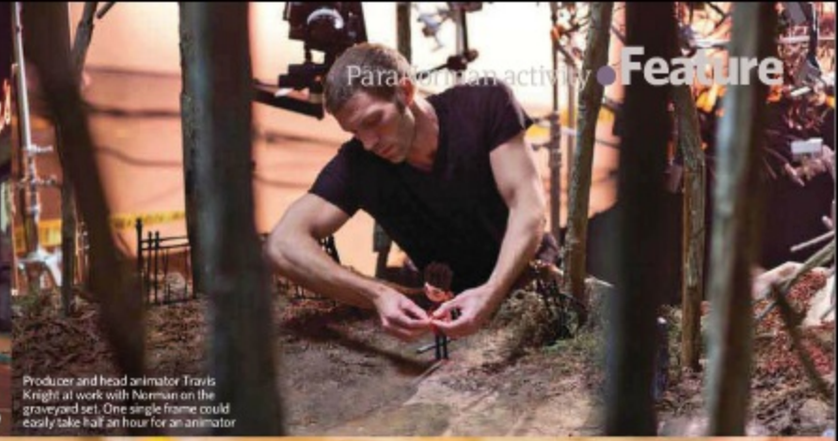
Building on the success and techniques of Coraline, with added zombies

Comedy thriller *ParaNorman* is the second stop-motion animated feature to be made at Laika in stereoscopic 3D, unifying the two art forms to tell a frightfully funny story. Set in the town of Blithe Hollow, site of a famous 300-year-old witch hunt, 11-year-old Norman Babcock is gifted with the ability to see and speak with the dead. Unexpectedly contacted by his odd uncle Prenderghast, who hits him with the revelation that a centuries-old witch's curse is real, only Norman will be able to stop it from going into overdrive and harming the townspeople. Packed with zombie menace, fast-paced humour and eye-popping effects, *ParaNorman* is a cut above the normal stop-motion movie, building on the techniques Laika developed for *Coraline* for a level of facial expressiveness never seen before.

Fell reveals that the directors and crew strove to get the right mix of colour and light, as well as a skin texture never before achieved

Brian McLean: "we model in the computer based on drawings, and then print them out in Rapid Prototyping on 3D Printers"

E



Producer and head animator Travis Knight at work with Norman on the graveyard set. One single frame could easily take half an hour for an animator

D

F

An in-computer model becomes a physical piece, one that is cleaned, sanded and hand painted for the animators to manipulate by hand

"Digital ghost treatments were made to physical puppet characters, while all the other ghosts Norman meets on his walk to school are entirely digital"

Evolution through 3D printing

Pre-visualisation is relatively new to stop-frame, according to animation supervisor Brad Schiff. "We didn't have much pre-vis on the stage, all of the animation testing of puppets was done practically on test units," he says. "However, we did use quite a bunch of pre-vis in the facial animation department. Because of the vast number of facial expressions each character needed to have, most of the personality of each character – faces, mouth and brow shapes – were drawn by 2D artists first. This enabled the directors to see the faces come to life, make comments on what was working, what wasn't and ultimately [they] became a blueprint for our facial animators to make the mouth shapes in the computer which were printed out [in silicone] and used on the puppets."

"Stop-motion is the technique that has been used since the beginning of cinema to breathe life to every kind of horrible monster"
Chris Butler

This technique is known as replacement animation and the basic approach is quite common: "With the introduction and advancement of the 3D printer, we are able to make all facial expressions and dialogue shapes in the computer ahead of time," says Schiff. "The animator sits with the facial animator weeks ahead of shooting... and is able to nail down the appropriate lip sync and expressions. Since you have already made these decisions, by the time the animator gets to the set, they can concentrate solely on the body performance and know that the faces are exactly what they are trying to get."

The actual 3D printing process is known as rapid prototyping and demands a strong understanding of real-world limitation and mechanics. "We look for [CG] modellers who like to work with their hands," says Brian McLean, creative supervisor of Replacement Animation and Engineering. "Artists who not only love working in the computer but also have traditional model making and fabrication skills."

The tools used are all familiar: "We start from a 3D scan of the clay maquette sculpt," explains McLean. "We remodel the scan data first in Maya and then ZBrush to get the subtle detail and tool marks that are present in the original clay sculpt. Once we get artistic approval from the directors of our 3D-printed sculpt, we retopologise the high-res head using TopoGun. At this stage we have to pay special attention to where eventually we will be cutting up the face into elements; brow and mouth, hair caps, ears and eye rigs. We then use Maya to design and engineer the face replacements and their internals."

As an example of the complexity of a replacement-face character, Norman's head consists of 78 different parts, designed and engineered on computer and printed on one of four 3D printers at Laika. "The face is rigged, animated and UV-[mapped] in Maya," adds McLean. "The texture map is painted in Photoshop."

Between *Coraline* and *ParaNorman*, Laika started experimenting with 3D colour printing. According to McLean the impact was significant, enabling elaborately designed stop-motion puppets. "The focus for us has been dealing with the unusual colour relationships in the printer and how to interpret and manipulate those colours with different layer transparencies and texture applications," he explains, adding that the beautiful skin tone comes from the colour being baked in by the printers.

"Through trial and error, Tory Bryant and her texture department have developed strategic applications and thousands of colour charts. These allow a more translucent flesh tone with the addition of higher levels of detail that you normally wouldn't expect to see from these colour printers," McLean continues. "Having a process that is sensitive to this specific material complements its strengths and weaknesses. I love how the characters' ears transmit light just like a real human ear. The way the 3D printer lays down colour allows for a wonderful subsurface scattering quality, reacting to light just like real skin."

"I loved the way the light shot through the rapid prototype material," agrees Sam Fell. "It gave the characters' flesh a kind of translucence – made them feel more alive somehow. I also loved the extra subtlety we found in the characters' expressions; it's a sophisticated story and we needed the animation to deliver a broad range of emotion. I can't imagine how we could have pulled some of the scenes off with old-fashioned mechanical heads."

One of McLean's favourite moments is when one character cries near the end of the film. "Never before have tears worked so well in stop-motion animation," he says. "The scene was a very tender moment and we really wanted the audience to feel the emotion without seeing an awkward, out-of-scale tear run down their face and ruin the moment. I think we were successful. I can't tell you how we did it, but I can tell you they were printed."

The art of invisible VFX

"The visual effects in *ParaNorman* can be divided up into the two traditional VFX categories of things you hopefully won't see and things you hopefully will be wowed by," explains visual effects supervisor Brian Van't Hul. On the 'won't see' list are extensive paint and roto fixes to practically every shot in the film to remove rods that the animators use to hold the

Drip... drip...

Rapid prototyping didn't just benefit facial animation techniques in ParaNorman

Water droplets in the film were physical, the result of the rapid prototyping department running an nParticle simulation in Maya. "For the toilet water, 2D reference was created for each shot by the 2D FX artist at the direction of the two directors," reveals Brian McLean. "This animation was brought into Maya as reference. One of our TDs, Rob Ducey, figured out a way to have the nParticle simulation imitate the 2D work. The particles were then converted to a poly mesh, which was then exported per frame as an STL file. Each exported model was labelled with a frame number and given registration pegs so the cycle could be shot on set. The physical plastic models were then processed and dyed to look like real toilet water."

D Animator Gabe Sprenger views instant playback of shots on the town square set – each completed frame was stored on a computer

E Director Sam Fell: "We wanted the lighting to fall on the characters... as if the scenes were just happening effortlessly"

F The rapid prototyping process generates different facial expressions for replacement animation

G Facial designs rendered for the rapid prototyping process – the result is beautiful and expressive facial animation

> "The way the 3D printer lays down colour allows for a wonderful subsurface scattering quality, reacting to light just like real skin"
>
> **Brian McLean**

characters up, painting back parts of the set that were cut away to enable their access, and also removing the seams that cut through the face of almost every character due to the face-replacement process. Post-camera moves, camera shake, depth-of-field blurs and re-times were also added in post by VFX as well as fixing CCD density shifts.

"They are all very time-consuming technical fixes that, if we did our job right, no one will ever notice," says Van't Hul. "On the 'hopefully wowed by' list is the production value we've added in post to extend buildings and environments that would have been too prohibitive to create and shoot practically."

The VFX crew applied enhancements to real, modelled characters like Grandma and Mr. Prenderghast. These digital ghost treatments were made to physical puppet characters, while all the other ghosts Norman meets on his walk to school are entirely digital. This adds to the blend of traditional and digital methods used. "The children filling the schoolyard are mostly digital characters with a few real puppets mixed in," adds Van't Hul. "Later in the film the townspeople turn into an angry mob and again, for large crowd scenes, we created them digitally with some real puppets mixed in."

More dramatic effects, particularly based around the witch Aggie, were also a mixture of physical and CG VFX. For a forest scene with stylised Tesla coil lighting, a traditional puppet was shot on-stage and the Visual Effects department added her dress, hair and lighting digitally. In this violent sequence she destroys the forest and turns it into a floating void of broken rock and debris. "The large main islands of rock were shot as practical elements and all the finer debris, background void and spectral ejecta she blasts at Norman is digital," explains Van't Hul. "Blending and matching the stylised look and handmade feel of the real puppets and sets to our digital versions was a constant challenge. When adding over-the-top effects, like lighting boiling clouds and spectral energy, we always began with testing traditional materials on-stage as if the effect was going to be hand-animated. We used those images to inspire us to create an effect that hopefully complements the traditional animation look and style and doesn't clash or overwhelm it with a synthetic computer-graphics feel."

H "The beautiful skin tone comes from the colour being baked in by way of the printers," says creative supervisor Brian McLean

I The mixture of traditional and digital methods was important for the whole team behind *ParaNorman*'s production

J Tristan Oliver adjusts the lighting on one of the sets. Physical lights and glass lenses contribute greatly to stop-frame realism

K Directors Chris Butler and Sam Fell discuss car sculpture with director of photography Tristan Oliver (left to right)

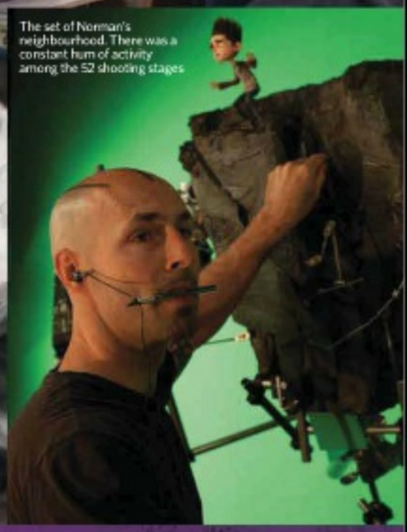
Shooting in stereo

So what did stereoscopic 3D enable the filmmakers to achieve creatively?

Chris Butler says the key to making a movie in stereoscopic 3D is to not let this added creative facet become a novelty. "It's less about throwing things in your face than luring you into [a] magical world," he says. "Of course, *ParaNorman* is one-part zombie movie, so we would have been remiss if we didn't include at least a few instances of zombie hands reaching out through the screen!"

More typical is a shot that sums up Norman's psychic gift in one camera move. "We see him walking down an empty street apparently talking to no-one, then the camera swings a full 360 around his face, importantly past his eyes, and we see that the street is now filled with ghosts," explains Butler. "We subtly pushed the stereo of the image at the same time so that the audience feels – not necessarily consciously – that Norman's world is more expansive than ours, that he sees deeper into the world around us, and now we do too."

With full-colour capability and larger machines in the rapid prototyping realm at Laika, the silicone printing process has advanced even further in the years since *Coraline*



The set of Norman's neighbourhood. There was a constant hum of activity among the 52 shooting stages

Stop-frame focus

For Fell, stop-frame enables the creation of a believable world. "We have real light falling on real surfaces being recorded through real glass lenses," he says. "There's a warmth and detail that even the most advanced CG rendering struggles to emulate. There's not much difference in the time it takes to make an animated feature. Stop-frame may cost a little less because it's harder to make changes and re-work; we commit to our scenes very thoroughly before we shoot."

> "We look for [CG] modellers who like to work with their hands... who not only love working in the computer but also have traditional skills"
>
> **Brian McLean**

From a story point of view, Fell reveals that the team wanted the world of the movie to feel real, imperfect and messed up. "Blithe Hollow is a town that is literally and metaphorically rotten around the edges," he explains. "Stop-frame allowed us to really get in and celebrate the kind of real-world wear and tear you find in real urban places."

Chris Butler describes stop-motion having a unique aesthetic. "It has a tactility that is mesmerising; it makes you want to reach into the screen and touch these real objects; something that the advent of 3D has made even more tangible.

"[DOP] Tristan Oliver's approach to this movie was to light it like it was a live-action movie, and that gave us a beautiful and consistent look in-camera," adds Butler. "There is a tendency in stop-motion, I think, to make things theatrical, to lovingly light every handmade inch as if each set is a stage production. We wanted to take our cue from a distinctly naturalistic look, where characters walk in and out of properly motivated light. Even with the lurid technicolour extremes we wanted to go to with our zombies, we made sure it was motivated by something real, such as neon store signs or traffic lights.

"When I originally started the first draft of the script [that would take 15 years to finish], I knew even then it should be a stop-motion movie. Stop-motion is the technique that has been used since the beginning of cinema to breathe life to every kind of horrible monster from *King Kong* to the sword-wielding skeletons of *Jason and the Argonauts*. It made perfect sense to make our zombies into puppets. What better medium could there be to create shambling corpses?"

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Pedro Manuel Guerreiro Fernandes
3DArtistonline
Username: arqui9
Website www.arqui9.com
Country UK/Portugal
Software 3ds Max, V-Ray, Photoshop

> Art is never finished. Rotating and flipping your image is a good way to take a fresh look at things; it helps you to spot errors and notice missing elements, as you can start to miss things the longer you work on an image

> The Greeble plug-in is great! It gave me a base mesh that I then started to add to. I knew that a lot of detail would be added in post so it was also important to have a good Vray Blend texture as the base, over which I would paint

Software used in this piece

3ds Max · V-Ray · Photoshop

Exploitation 2012

This image is something I have wanted to create for a long time. I took some time to look back on my childhood inspirations and influences; it's a tribute to the many great films that have inspired me, be it *Alien*, *Blade Runner*, *Star Wars*, or the great *2001: A Space Odyssey*. This image took around three to four months of work on and off in my free time.

> The colours and tones were hard to get where I wanted them. I sought to give the image a half-Earth, half-space look using some adjustment layers in Photoshop set to Overlay and Color Dodge modes, to bring the image together and to help centre the focus on the middle section

> I used quite a large original resolution (7K wide) that I could shrink down, helping to compress the pixel information and bring it all together. I also had to fiddle with the cropping, as it wasn't to my liking in the beginning, so I had to expand the canvas and try to fit it to a wider view

Learn to create your own photorealistic plants for enriched arch-vis scenes

With the Disc

- Plant & butterfly models (.max format) with maps
- Ivy Generator preset (.ivy)
- Video overview (.avi)

Learn how to

- Create your own references
- Model assets from references
- Shade and texture models
- Set up your scene
- Retouch final renders

Software used in this piece

3ds Max · V-Ray · Unfold3D · Photoshop

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Paweł Podwojewski

Personal portfolio site www.motyw.com

Country Poland

Software used 3ds Max, V-Ray, Unfold3D, Photoshop

Expertise Paweł believes his strongest skills lie in lighting and compositing

Build unique arch-vis assets

Urban Survivor 2012

"Create a plant model that can be easily reused in arch-vis scenes to enrich your environments"

Paweł Podwojewski is an architect and CG artist, specialising in architectural visualisations

In this tutorial you will learn how to create realistic-looking plants with simple tools that will enrich your arch-vis scenes and bring a unique touch to the final output. We will go through planning the model and learn how to model, shade, render and finally retouch our image. We will also take a quick look at basic particle systems for extra details.

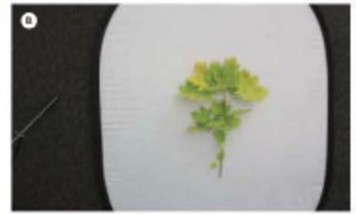
Concept

The main idea is to create a plant model in a few steps that will add extra detail to your arch-vis scenes. The skills covered are designed to help you build your own reference library of assets to use time and again in your scenes and give them a unique touch. To keep things efficient I will be using techniques in 3ds Max and with plug-ins that are available for free online where possible.

References and inspirations

Choose your references, prepare photos and establish a concept

01 Shoot the mood Creating nature in 3D is a great challenge, which makes it crucial to focus your early stages on finding good references. We strongly recommend grabbing a camera – even if it's on your mobile phone or another device – and shoot photos. This will give you a much better understanding of the subject and you will notice much more detail than when looking at images on the internet A.



02 Create a base for future textures Try to shoot leaves in orthogonal view on an evenly-lit surface. Make sure you don't have any strong shadows – this will be very helpful when creating the textures in the later steps B.

03 Key elements in the scene Once you have all your necessary photographs you can prepare extra detail for the key elements. In this case, the leaves will be in our focal point. We have taken two samples of leaves and made a simple scan. Using Photoshop in the next steps we will create all our relevant maps. Good quality images will let you render the created models even on close-ups, which may be a very good way to frame your architectural scene and focus the viewer on certain parts of the image C.

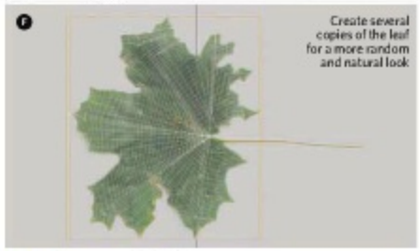
A Create your own references. By shooting your own photos you will remember more detail

B Shoot your references in orthogonal view

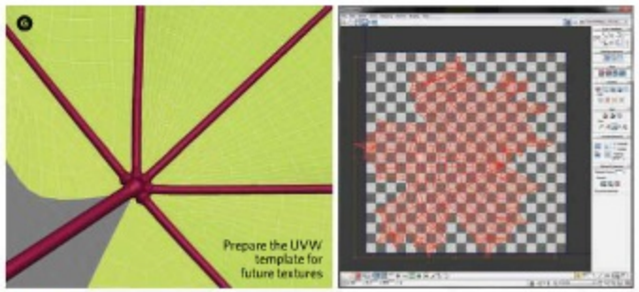
C Create detailed textures by scanning key elements

Model your assets

Start the modelling with simple shapes then move to the details



04 Plant structure modelling Let's start this step with a plane and a texture showing your plant reference. We've used splines to build the base structure. This is a crucial step that will determine the final plant appearance. Please be careful to work in real-world units to keep the proper scale of elements. It's very important for physically-correct light distribution while rendering and refining the scene with Particle Flow. Try to build a low-poly mesh and keep the MeshSmooth as a modifier. This will let you easily edit the model in the next steps when you decide to change, for example, the composition. Relatively low- or mid-poly models will be easier to use in more complex scenes and will also save memory while rendering. Remember, your workstation processing power is always limited and we are working on details that should be easy to use and not stress your GPU **D**.



05 Leaves and stalks For unwrapping the stalk we'll use the Unfold tool. This is a simple and easy-to-use interface for the unwrapping process. We'll build the leaves in full geometry, because without Opacity maps the leaf will render faster. This is also important because we want to add extra details with a Particle Flow system, so the particles in this case will stay exactly on the leaf surface. In the case of using an Opacity map and plate geometry leaves, this trick might not work and some of the particles will possibly stay outside of the leaf. Start the model with a low-poly mesh. Make sure to use modifiers to create a couple of copies of the same leaf for a more random and natural look **E F**.

06 Extra leaf details and unwrapping While aiming for very realistic effects, we may want to add some splines underneath the leaf to create veins. To do this, select the main edges of your veins in the low-poly model and detach to shape. Add the Normalize Spline modifier and copy the modifiers we added in the previous step to the leaf. This will guarantee the spline will perfectly fit the leaf surface. Once you have the model complete, go back to the editable poly level and add Unwrap. Go to Edit mode, select Planar mapping, pack the UVW and choose the render UVW template from Tools. This will be the template we will use in Photoshop for texture creation **G**.

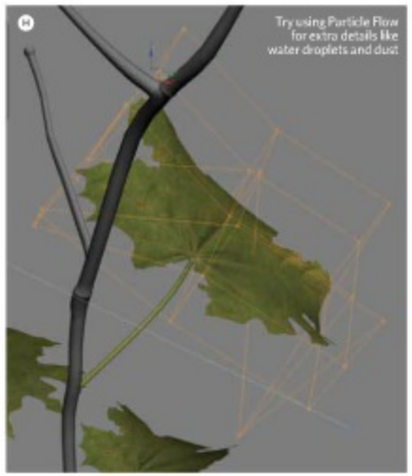
Shoot your own references

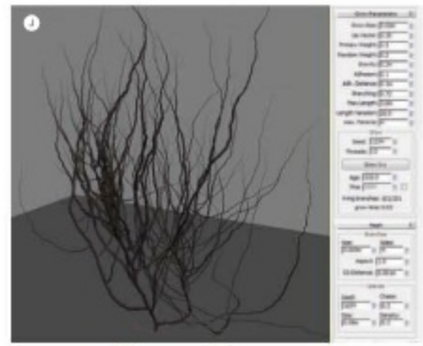
Working with your own photos has a huge advantage. You can choose exactly the details you want for model creation. However, sometimes it's impossible to shoot what you want. In these cases there are very helpful resources you can find online, such as CG Textures (www.cgtextures.com) and Shutterstock (www.shutterstock.com).

Get realistic and natural effects

Make detailed leaves quickly and easily

07 Final leaf adjustments Once the leaf models are finished we can spend time placing them on the plant. In this example we have spread the leaves manually. To prevent them from looking too similar you can use a simple FFD 3 x 3 modifier. A couple of mouse clicks will refine your general model look. On some leaves we also want to add some dust and seeds, which we can do using the PArray particle system. Create the PArray object and choose the leaf model on which you want to create particles. Play around with the particle type, amount and size until you're happy with the result. Set the particle percent for the viewport display to 100 to be sure of the result. You can decrease this value later to increase viewport performance. This is also a simple way to create water droplets **H**.





08 Level of detail (LOD) While working with detailed geometry we should keep in mind not all elements will be equally exposed. Smaller elements will be less visible and also require less detail. To be sure you're heading in the right direction, render a couple of previews; in this case the top leaves are much simpler than the larger ones on the bottom **I**.

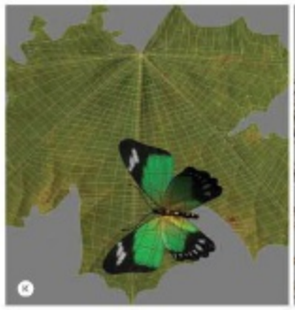
Use shortcuts

When you really don't have time and you desperately need a plant model, use the free Ivy Generator (www.guruware.at). By adjusting the settings, you can achieve natural-looking plants in seconds.

I A quick plant creation using the Ivy Generator

G Play with MassFX and create a realistic ground

09 Use shortcuts In some cases we'll need to create a bush or tree quickly. If you're not experienced with software like Onyx or GrowFX you may want to use the free plug-in Ivy Generator developed by GuruWare. This small plug-in lets you quickly create typical ivy, but also when you play a bit with the settings you can create great-looking plants. You can have a close look at our settings by checking out the supplied preset in the tutorial files. More importantly, you can create your own leaves and use them with this plug-in too. This feature enables you to create unique models fast **J**.



10 Final details Good-looking plants need a proper ground, so we'll create real geometric branches. First we need mid-poly branches that can be scattered on the ground. We want them to collide, so to create this simulation you can use MassFX in 3ds Max. Be sure to create a couple of branches and then add the simulation to a few elements at once (otherwise you may cause 3ds Max to crash). In the Settings of the Modify panel, you can choose a preset for the material. Also make sure to choose the Mesh type as Original. This will make the calculation longer but also the effect will be much more convincing. Details like bugs and butterflies may also make a nice touch **K**.

Artist showcase

Paweł Podwojewski

An architect by profession and 3D artist by passion, Paweł's designs and concepts are influenced by architecture from various industries, including retail, residential and commercial and urban planning. In 2009 he started CGWorkshop.org, an online service that provides training for CG artists in the form of video tutorials and workshops.

Underwater Hotels **3ds Max, V-Ray, Photoshop (2011)**
Waterdiscus – an underwater hotel. Paweł is the architect behind the design and rendered concepts

Diving Centre **3ds Max, V-Ray, Photoshop (2011)**
A concept sketch created for the Underwater Hotels project in 2011

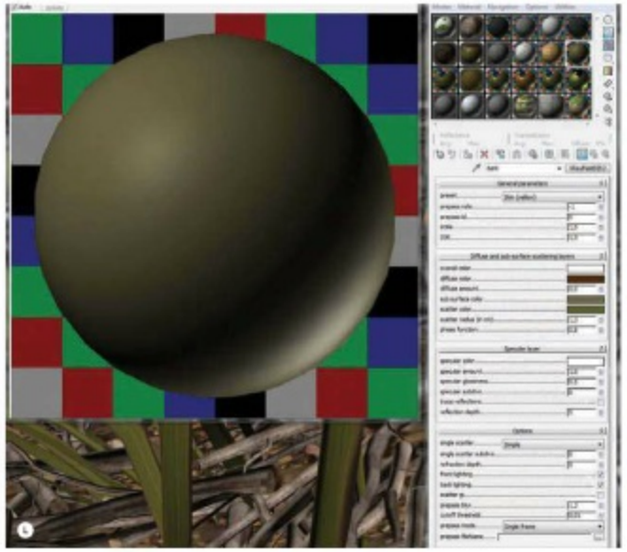
Housing in France **3ds Max, V-Ray, Photoshop (2012)**
A housing project in France by Nadau Lavergne studio located in the Unesco-protected zone

Shading and textures

Add some visceral detail for greater realism

11 Stalk shading Stalk material is very specific. To create a physically-correct shader, choose VRayFastSSS2. The light should travel through the stalk, the same effect we can see on human skin. This solution makes sure we get similar results. Since the stalk is pretty well exposed, the decision is simple. When you look at the shader in the Material Editor you'll see you can choose from a bunch of presets L.

12 Paint leaf textures Now we'll prepare our UVW templates from earlier. Open a template in Photoshop and fit scanned leaf images or photographs. Be careful at the edges, paint a little outside the template to avoid strokes on leaf borders while rendering. Once the Diffuse map is ready, create one more for translucency and one for the bump and reflections. For the displacement we'll paint a custom map to increase the visibility of the leaf veins M.



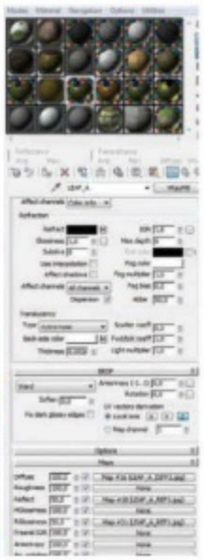
Resolution versus quality

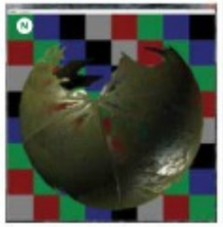
While painting textures, note that the resolution has a huge impact on the final effect. It's best to use a tripod while shooting images for crisper reference. This will enhance not only the Diffuse maps, but also the conversion into Displacement and Normal maps. For creating Normal maps, you can use a free Photoshop plug-in that you can find in the Developer Zone on the NVIDIA website.

L We use the VRayFastSSS2 shader for translucent objects

M Paint extra Displacement maps for higher-quality results

13 Leaf shaders Leaves are also a good example for the VRayFastSSS2 material. To speed up rendering we'll use translucency in the default V-Ray material. Note you need to add a Color map that will affect the bottom part of the leaf in the Translucency channel. Usually it will be a slightly brighter map than the Diffuse map. You can use a Color Correct map to tweak the Diffuse map straight in 3ds Max. Enable Translucency in the Material Editor. Use a hybrid model with Thickness set to 0,002m N.





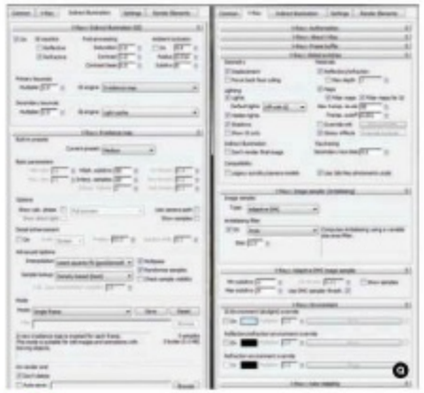
14 Light the scene We'll follow this scheme and use a V-Ray dome light as the main light source. Inside the dome we'll use a texture from CGSkies (www.cgskies.com) with a similar atmosphere to the reference. Note that the dome light produces realistic light rays and is very accurate. It's most likely you'll receive a little noise while rendering with low settings, but you can be almost sure that no splotches will occur O.

Scene setup and final retouching

It's time to set up the final scene

5 hours creation time
Resolution: 4,200 x 2,800

15 Set up the camera Now let's set up the VRayPhysicalCamera. This camera enables you to control the light in the same way as a real one. With the most interesting features we can add motion blur and depth of field. You must be careful with sampling to keep decent rendering times. Please be careful to select the Depth of Field box as well as the Motion Blur and Bokeh effect. In Bokeh, change the Bias to 0.5. This makes the bokeh circles brighter on the edges. Play around with the focal distance until you're happy with the results. Work on a simple shader to test the DOF and speed up rendering times P.



16 Rendering and extra channels The rendering setup is pretty simple. Use a GI Irradiance map and Light Cache for secondary bounces. Use antialiasing as a default area filter and linear colour mapping with Gamma set to 1.0. For better details use the Adaptive DMC image sampler. The benefits are especially visible when you have a lot of tiny elements in your scene (branches, in our case). Thinking about retouching, we should add some extra channels like Raw Reflections and Reflections Filter. In the final steps we'll control the intensity of reflective surfaces. We use DOF inside V-Ray so masking with wire colour or multimatte is now much more difficult Q.

17 The final retouch With physical DOF it's much harder to work with masks in Photoshop since a lot of elements are out of focus and the edges are blurry. What we can do in this case is basic colour correction by tweaking the colour balance and contrast. It's best to use Curves for this purpose. Use the Raw Reflection Render element with Reflection Filter as a mask to better control the amount of reflectivity on the leaves and other selected objects. Also use the FastSSS2 channel to increase the translucent effect on stalk. You can add some noise for extra photorealism at the end R

Save time by using a great composition

A good composition makes life a lot easier for CG artists. When we plan a shot correctly we can drop lots of details and at the same time convince the viewer about tons of work that had to be invested to achieve such a result. Mind the level of detail that should change on each ground. Think about framing elements that may enhance the shot and also link the viewer's focus on a certain point on the image.

N Create leaves with translucency. Achieve a photorealistic look and decent rendering times

O A simple lighting setup with only one dome light

P You have the option of playing with depth of field and bokeh using the VRayPhysicalCamera

Q Think about render elements that will help you while in the post-production stage

R Render elements are helpful while final retouching

I made this...

Incredible 3D artists take us behind their artwork

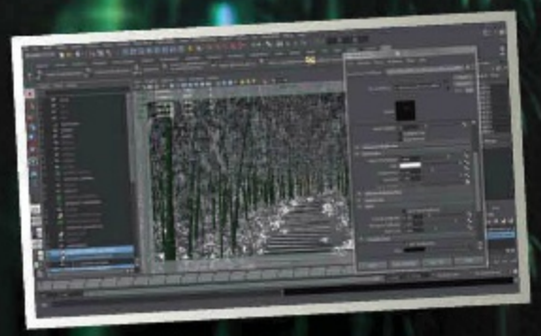
Artist info

Alex Alvarez

Website www.gnomonschool.com
Country United States
Software used Maya, mental ray, Onyx, After Effects
Bio Alex is the founder, director and owner of Gnomon and a creature development artist

With the Disc

Video tuition, courtesy of The Gnomon Workshop



> It is a good idea for any type of plant or tree to have at least five variations that are randomly selected via instancing or geometry paint. This is one of the benefits of using procedural tools to create the geometry, as they all have random seed attributes that enable you to quickly randomise a set of values

> For nature scenes... manual placement is far from ideal. I use particle instancing as well as a geometry paint tool to position my elements. For dynamic instancing, I have my terrain emit particles with no speed [and] paint textures to control where [they] appear

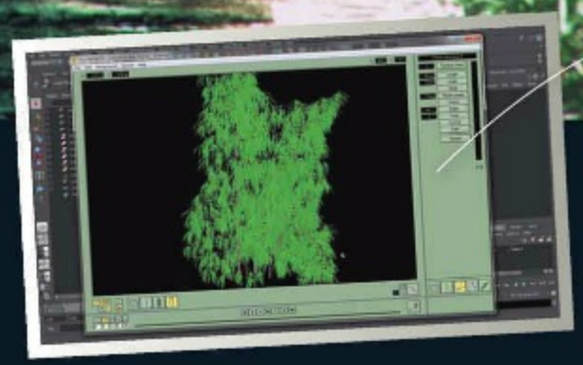
Software used in this piece

Maya · mental ray · Onyx · After Effects

Bamboo Path 2012

I've spent a lot of time this year developing my workflow for natural environments, while building a library of plants and trees with Maya's procedural paint effects engine and the Onyx suite of tools. This bamboo forest path started as a brief experiment using Onyx Bamboo, which quickly evolved into the final image over the course of a day.

> I prefer to use After Effects to composite my final images, even for stills, due to the non-destructive editing. Using a ZDepth pass I add depth of field in post, as well as blooming highlights (glow) and colour correction via the Lenscare, Sapphire and Magic Bullet plug-ins



> The Onyx suite of tree tools is extremely valuable and designed to be more physically accurate than, for example, Maya's Paint Effects tool. In the case of real-world bamboo, the branches grow from the gap between each segment along the tree's trunk

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Turn to page 19

Futuristic cityscapes

Floating City 2012

A conceptual 3D illustration for a floating futuristic city, complete with landing platforms and foliage

Neil Maccormack is a freelance 3D artist from the UK living and working in Geneva, Switzerland

This tutorial will demonstrate how to go about creating a large-scale sci-fi scene, using LightWave 11 for the main 3D part and then Photoshop as the post-production and painting program.

The idea is to create a conceptual design for a floating city and then model, texture, light and render it all out ready for post-production in Photoshop. We will add in other 2D elements along the way with some basic matte-painting techniques and make final retouches to complete the scene.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Neil Maccormack

Personal portfolio site
www.bearfootfilms.com

Country Switzerland

Software used
LightWave, Photoshop

Expertise Neil says his greatest strengths lie in composition, scene setup, lighting, modelling and digital painting

Composition, layout and scene setup

How to compose a scene and find the best angle

01 Establish your composition Creating a large-scale scene can seem daunting at first, but as long as you stick to some basic rules then it needn't be. First of all, know your layout format. I was working within the restrictions of the magazine pages, so I knew the dimensions of the image would be portrait rather than landscape. Second, I always try to frame the image using something to draw the eye to a focal point, so make sure you decide where you want the eye to focus. Finally, try to create depth in the image by placing your objects in such a way so that they fall back into the image, giving depth and retaining the interest of the eye A.

02 Create the background Next is to decide on the background of the image. As this is to be a floating city I know the background will be the sky, but rather than just use images of clouds, I want to create a painting in Photoshop that is moodier and slightly more stylised. I create a basic painting, using a muted colour palette and some overlaid textures, to paint the image at the dimensions required. I then take this into the LightWave Layout to start setting up my scene B.

03 Scene setup and layout Start by setting the camera options to the same dimensions as the background image. I'm using some placeholder or low-res objects from my personal asset library to make some test renders to figure out the best angles and placements until I'm happy with the overall composition. Normally this process takes some time, and many renders are done in low resolution to find something suitable C.

A An early attempt to create the right composition using some basic geometry

B A background is painted in Photoshop to use as a backdrop. Nothing but basic brushes and a few overlaid texture images are used for this

C At this stage it isn't necessary to do too much modelling: use low-res objects and renders to finalise your basic layout

Learn how to

- Establish composition
- Tackle basic modelling
- Improve your texturing
- Set up your scene
- Create effective lighting
- Render out your scene
- Handle post-production
- Make colour corrections
- Experiment with matte-painting techniques

Concept

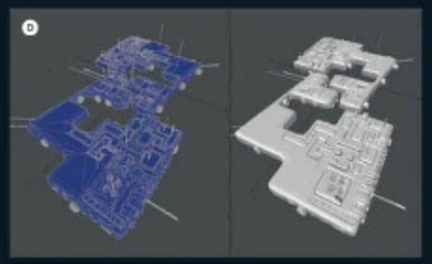
The concept for this image is to design a flying – or floating – city with water and forest features. We will be aiming to relay a sense of gargantuan scale and futuristic design in the final illustration.

Software used in this piece

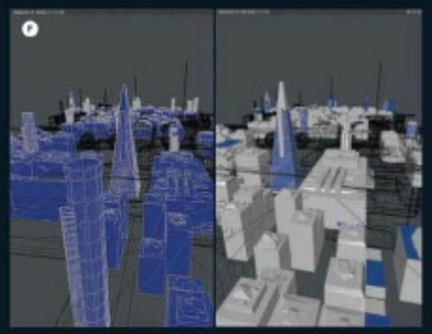
Photoshop LightWave

Time to get modelling

With the composition complete we can now begin the modelling stage



04 City platforms and structures Knowing that the city itself will be based on platforms, I start to model them in LightWave, using the Pen tool to create basic flat structures. Once I have these complete I can then bevel the polygon outwards and, using the Knife tool, begin to cut some extra lines in the poly to Smooth Shift out and create some bulk on the platform. The platform, once done, can then be mirrored in the Y-axis to create the full structure D.



06 Detail the city Just having the basic buildings isn't going to be enough, so it's important to have one or two hero buildings to stand out and break up the city. I use a very similar method as before: with a singular start polygon and subdividing a few times to create more geometry. If you can do this for three or four different buildings and place them on the same layer, they can really begin to make the city feel realistic F.

D The platform finished off with some extra bevels and Smooth Shifts. It's not necessary to create super high-res geometry – basic polys will be enough

E The more randomly these buildings can be bevelled and cut, the more realistic they will appear in the final image

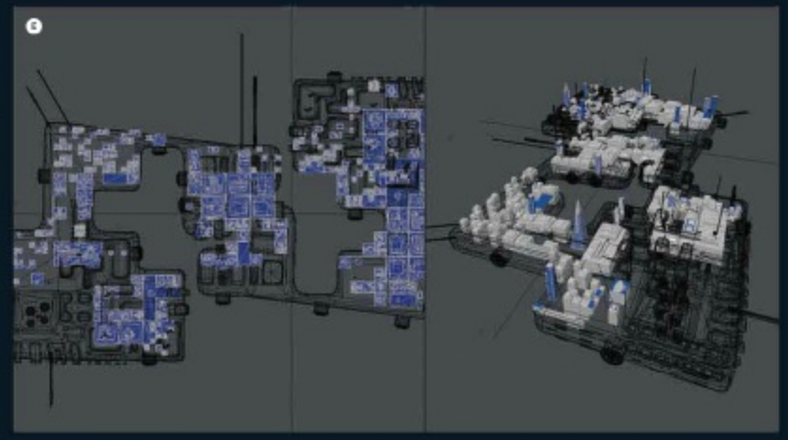
F Here you can see some of the hero buildings that were modelled, as well as some roof Numies added in

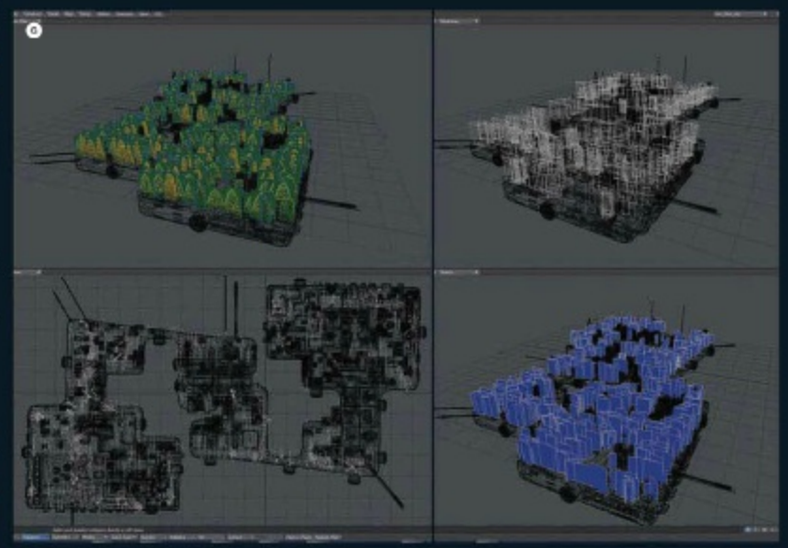
G I create three different layers of trees to avoid repetition. Repeat the process, remembering to use a different poly and UV map each time

Backgrounds

Normally I like my images to have a certain style or look, but in a studio environment this isn't always possible. In early versions of the image I tried to use different skies and different cloud images before deciding to paint my own. Existing cloud and sky images have an advantage of there already being an evident light source (the sun) so you can match the 3D lighting with that of the background image.

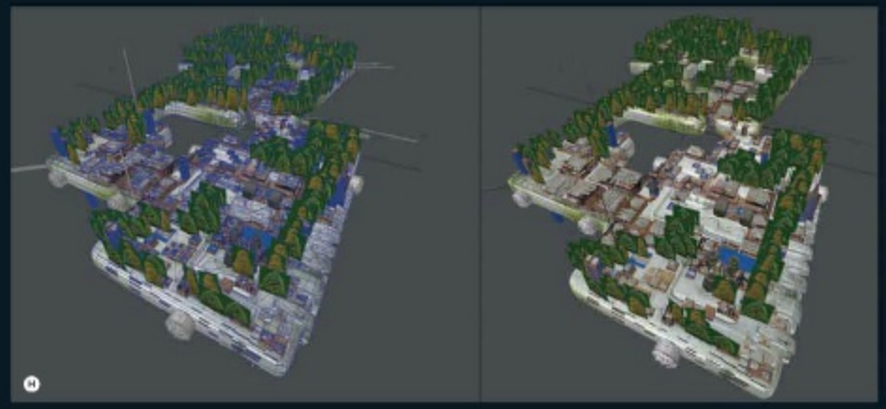
05 Basic city modelling The city modelling is done in a similar way to the platforms. I use the platforms in a background layer as a guide and create a flat poly, which is then divided into uneven squares using the Knife tool. Squares outside of the boundary of the platform are deleted and the others are then bevelled up to create the buildings. These bevelled buildings can then be knifed horizontally and vertically to create random sections, which can then be highlighted and bevelled again. The more times you can do this the more geometry can then be generated, and the more detail you will appear to have E.



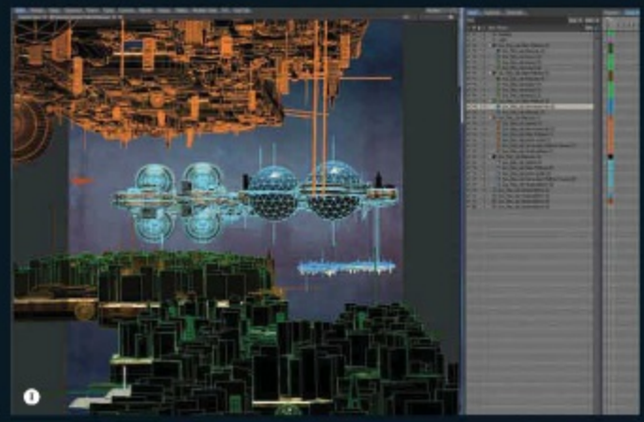


07 Add some trees There are many ways to model trees, so in order for this tutorial to be usable in versions other than LightWave 11, I'm going to map tree images to flat polygons. Again, with the platforms and buildings in the background layer, I use the Spray Points tool to create points where I want the trees to be. Each point will then represent a tree. I create a very simple flat poly and a planar UV map for this poly and, with the points in the background and the poly in the foreground layer, I use the Point Clone Plus tool to create the trees. We now have multiple tree objects all cloned so we can texture them using one UV map G.

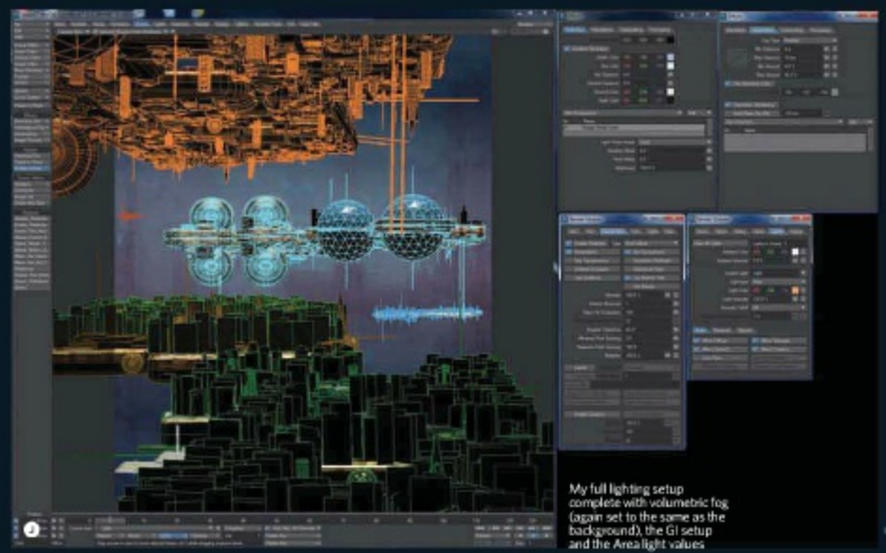
08 Basic texturing The texturing for the city buildings is really quite simple. Divide the city up into three or four different surfaces, and for the main body of the polys simply cubic-map an image of some industrial containers as the base texture. Repeat this layer in the Diffuse and Bump channels. For the platforms, use an image of a dirty, leaking wall and again cubic-map them in all three channels, as mentioned before. The trees have actual images of trees mapped to them using the UV maps created before. Then, once brought into Layout, we'll create a black-and-white version of the tree texture to use a Clip Map in the Object Properties. This way LightWave will only render what the Clip Map leaves behind on the poly, which in this case is the tree H.



09 Scene layout Now that we have the majority of the modelling, we can go back to our basic scene setup and start to bring in our higher-res objects. Because it's easier to work with models in layers, make sure you separate your higher-res objects into layers and then parent them in the scene once you have imported them. Also remember to colour code each object to make selecting them easier. If you clone layers to have multiple copies in the scene you can organise them easier I.



10 Light the scene Lighting the scene isn't too complicated in this case. By default I tend to use an Area light as my main light source. I then tweak the colour and strength of the light to suit the scene. I've positioned the light to shine through the gaps in the higher city platform to the lower, as this creates some interesting areas of focus between the lit and shaded parts. In this case I find the orange sunset light colour highlights the objects well and really helps to create the mood I want J.



My full lighting setup complete with volumetric fog (again set to the same as the background), the GI setup and the Area light values

Clip Maps

Creating trees using the Clip Map process can be an easier low-poly alternative to using actual tree objects. Keep an alpha image of your tree texture available to map to the object properties in the Clip Map section. Alternate ways could be instancing in LightWave 11 or using a point cloud and then clip-mapped hypervoxels to create the various foliage.

H In LightWave 11 there is also the option to create trees using the new Instancing system

I The scene layout. Note the colour-coded objects that are all parented correctly

Artist Showcase

Neil Maccormack
Neil is a 38-year old freelance artist from the UK living and working in Geneva, Switzerland

Finlake LightWave, Photoshop (2012)
A conceptual piece for a cliff-based landing port. The same methods in this tutorial were used for this piece, including the same lighting and methods for creating the background

Osaki LightWave, Photoshop (2012)
A design for a floating ship. Neil wanted to frame the image by using near-camera objects to create a natural frame. The foreground objects don't need to be too detailed here, as the eye doesn't really concentrate on them; it's simply a way to highlight the focal point

Trans LightWave, Photoshop (2012)
A futuristic design for a mobile war machine. Neil used Photoshop to create the background and a simple ground poly object to catch the shadows, showing the integration between 3D and 2D

Progress the scene

Prepare the scene for rendering and post

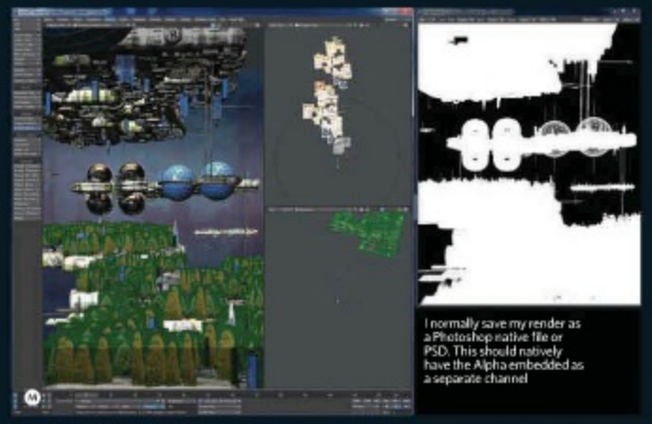
Here is my full GI setup. Notice that I activate the Viper window to check the brightness

11 Use Global Illumination I set the Image World environment to be the same as the background image. This way the colour of the bounce light takes on the colour of the sky, which is what happens in reality. Try to adjust and play with the brightness and offset the background image for different results. Alternatively, if you have a sky HDR image, use it as the Image World source instead of the 2D painting. As long as the image matches the background picture's lighting, it will give great results K

12 Render the image Once we have everything set up in the scene, we're ready to render. I always post process a render, so at this stage I am not too concerned if the colours are not perfect, or if my lighting is slightly off. I edit the camera properties and change the Resolution to 100% and the Samples up to 20. I can also add some Irradiance Falloff, which gives the image a slightly darker edging and helps the composition. If I need different render passes I can add the compositing buffer export that will export these for me L.

Global Illumination

Sometimes using GI at all isn't an option due to high render times. Alternatives can be to fake the illumination by creating a light dome of luminous polygons all facing inwards, with the background mapped as a texture. As this scene isn't animated you can cache radiosity, so you don't have to render it every time.



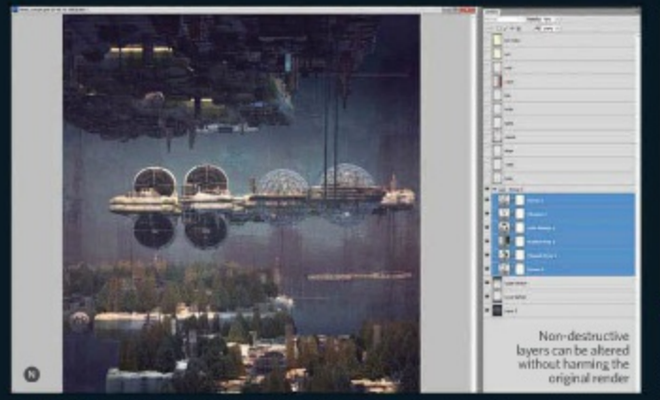
I normally save my render as a Photoshop native file or PSD. This should natively have the Alpha embedded as a separate channel

13 Prepare for Photoshop With this image there isn't really much to do before post-production, but one thing to look out for is to ensure your final image has an Alpha map when rendered. The Alpha map is very valuable in Photoshop as it will enable you to select certain parts or objects of the image that you can paint or alter in Photoshop without disturbing other parts of the image. Once you render out the final image in LightWave you can save the Alpha map separately from the Image Viewer window – just to be sure you have this M.

Perfect your post-production

Use Photoshop to process the 3D-rendered image

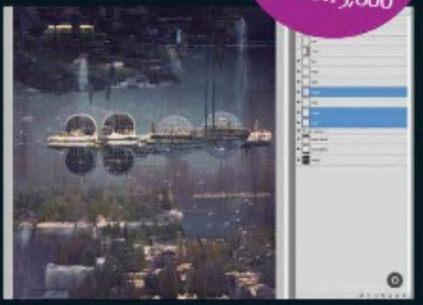
20+ hours creation time
Resolution: 3,000 x 3,800



Non-destructive layers can be altered without harming the original render

14 Colour balancing and tweaking To kick off the post-production I Sharpen the image once and add the Noise filter. I then create a new group of adjustment layers to tweak the tone and value of each colour until I'm happy with the results.

For me (and my style), I like to include a layer to slightly lower the vibrancy and saturation of the image. I also like the image to be lower in these values to give a grainier, more sci-fi feel. The other layers are colour adjustments, a colour channel and a slight gradient layer to boost the contrast N



15 Matte-painting techniques Next I begin to add in some extra 2D elements to the image to really take it to the next level. I use some images of waterfalls to integrate with the image, just selecting the water and copying and pasting onto my image. I can then tweak the contrast, colours and shadows to match my picture. I then overpaint using a simple Scatter brush with some foam and falling water. The clouds are added using a simple Soft Round brush in the lower and mid part of the image, each time selecting colours from the image itself to use as the cloud colour. Lights on the buildings and aerials are also added with a small square brush as well as the white-painted birds O

16 More colour correction With the final image I still want to tweak the colours even more by giving a warmish (redder) right side to the image and a cooler (bluish) left side to the image. This will help the viewer read the image from right to left. I add two more layers – both with Layer Masks – to do this and set the red layer to Color Dodge and the bluish one to Hue. This will slightly subdue the colours on the left side and slightly warm and enhance the colours on the right. Overlaying with photos of metal is often a good way to change the mood of an image. Play with the Opacity and Layer Mode until you find something that fits P

L My full GI setup shows the camera properties and compositing options

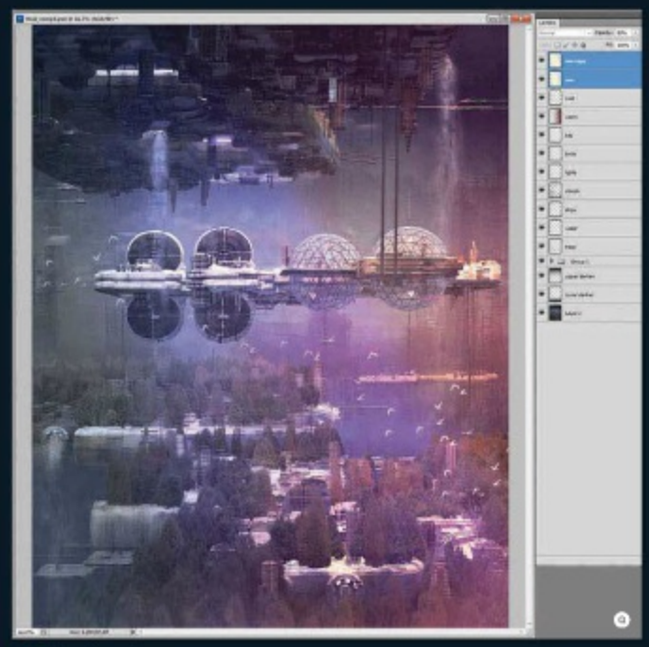
P After going through many variations, I find these two colours work well

O I add in one or two extra trees using the same methods as the clouds and water

Q The final two sun layers are added over the other layers, so that they are all affected

A little sunshine

Sun rays can be done in your 3D package. LightWave uses Volumetric lights in order to do this. The process involves cloning your 3D scene, matting everything in black and enabling the Volumetric light so you only render the light to a black background. This can be composited over the top in Photoshop or your compositing package.



17 Final touches To completely finish the image I want to add in a couple of sun rays in the middle of the image to try to show the sun shining from above, through the gaps in the platforms. I paint these rays with a large round soft brush in yellow then set the layer to Divide, which turns them a slightly bluish hint – which works quite well but isn't enough. So I duplicate the layer and reduce the second layer's opacity slightly to portray the effect Q.

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Nick Kaloterakis

Website www.kollected.com
Country Australia
Software used Maya, mental ray, Photoshop
Bio Nick has worked in the VFX industry for 12 years. He runs his own design studio in Sydney.

"I used Maya for hard-surface modelling and textures, mental ray for lighting in a physical, accurate scale and for rendering (HDRI with mib_ray_switch). Photoshop was used for the final comp and colour correction"

"Detail, detail, detail. In my experience the more you have to feed the eye, the more wow factor it brings and makes a huge impact at the end result"

Software used in this piece

Maya · mental ray · Photoshop

Black Drone 2010

The Black Drone was a project assigned to me back in 2010... to illustrate the latest technology in autonomous engineering and design. The environment was a crucial part of the project to bring the secrecy and mysterious vibe with a touch of futuristic feel!

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Sculpt a space vehicle

Ballade of the Lucanus 2012

"The results is a space-opera-inspired mash up of vessels, all created using the same workflow"

Istvan is a digital artist and illustrator based in Geneva, Switzerland

SPECIAL
SCULPT FLYING VEHICLES

The 'hard cut' method

The 'hard cut' method consists of modelling using only Clip brushes. Activating BRadius (Cmd/Ctrl+Shift+ Spacebar and click on BRadius) enables a very powerful tool to create shapes with a hard-edged look. But be careful: if you want to achieve the effect of an insect's shell, you shouldn't cut randomly. The cuts should look like those of real insects. For example, the cut lines of the abdomen are often repetitive, becoming increasingly tighter as they approach the body (such as on the abdomen of wasps). So for this concept, we must achieve the final shape of the battleship without forgetting the strong lines found on real insects.

Software used in this piece

ZBrush · Photoshop · Illustrator · Vue

With the Disc

- Three ZBrush brushes
- Three videos showing the 'hard cut' method, Group Loops method plus masking and texturing techniques
- One .vue file (the planet) and a PSD of the final composition

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Istvan

Personal portfolio site www.behance.net/chaotic_atmospheres

Country Switzerland

Software used ZBrush, Photoshop, Illustrator, Vue

Expertise I use 3D as a way to create final artwork; I'm not necessarily specialised in any field. I tend to switch between techniques and software to create the objects I need to finish my illustrations.

In this tutorial we'll create an insect-inspired battleship; a vehicle that flows through space curled into itself like a cocoon, but when attacking opens up its wings and gigantic claws.

Remember, even though we're making a battleship here, the method described can also be used to model a whole host of other types of vehicles, buildings, weapons and more. Once you've secured the skills, you'll be a hard-surface sculpting master in no time.

Before even opening ZBrush, always think through the details of the project using photo references. In this case, try to imagine the universe where a concept like this would have evolved. Try to set your objectives in context. Here we're not thinking about specific designs for a battleship, just about the details – imagine you're looking at an image so closely that you can understand all of its detail without having to see the entire image in full. This process enables us to define our needs: the techniques we'll use, the outlines to be used in ZBrush's ShadowBox, the textures and so on. It also helps to get your references firmly in your mind – which in this case includes the anatomy of insects and the functions of a battleship.

Once this ground work is set, we can then start work in ZBrush, remaining open to interpretation as we create.

Learn how to

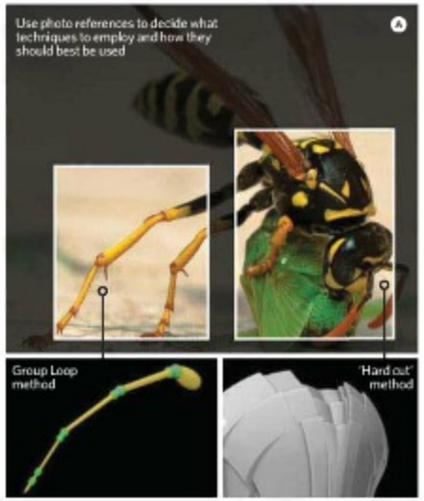
- ☑ Design a concept completely from scratch
- ☑ Implement the 'hard cut' modelling technique
- ☑ Use Group Loops
- ☑ Add environment lights
- ☑ Make multiple BPR renders

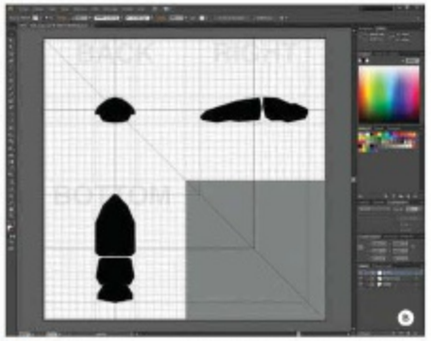
Concept

The concept originated with a moth-inspired battleship model that I originally created to fight in the game *EVE Online*. Based on its success I decided to create other battleships using the same workflow, to start a small fleet!

Lay the groundwork

Watch the details but don't worry about the battleship… yet!


Use photo references to decide what techniques to employ and how they should best be used
A
Group Loop method
'Hard cut' method



01 Key points and references The battleship is going to have the resemblance of an insect. We will model using the 'hard cut' method, which will be described in the following steps. In this way we can replicate the hard-edged look of an insect's shell. We will also use ZBrush's Group Loops method to create the parts of the ship that will resemble legs and antennae.

I've chosen an insect species that has extraordinary features as our focus: the Lucanus, Britain's largest known terrestrial beetle. This insect has huge claws and a thick and sturdy look. Using these distinguishing features helps us define the function of our battleship: a lightly armed ship that's strong and capable of inflicting heavy damage **A**.

02 Set up a base outline I begin by drawing a basic body of the ship in Illustrator. The shadowboxbase.ai file is supplied as a tutorial file with this issue. Basically, you just rough out silhouette images for the front, side and top views and then export the file as a JPEG. We can then use the image to create the base form using ShadowBox in ZBrush. You can also design the wing shape in Plan view. We'll use these shapes with the Make 3D function of the Alpha menu in ZBrush (covered in Step 5) **B**.

The Group Loops method

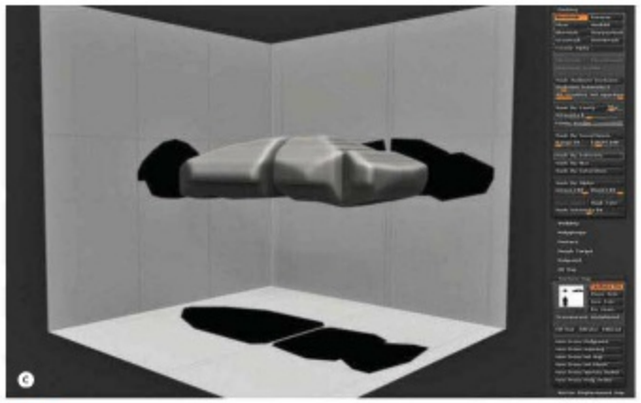
The Group Loops method can easily create structures that look like insects' legs or pipes. On the Lucanus battleship, I use this method for the claws and for the tubes that run along the surface of the ship.

I create a web frame using ZSpheres and export it as a new tool with Adaptive Skin. I then go to Tool>Geometry and click on Group Loops. This creates divisions between each branch of the frame. Group Loops have the same Polyframe, so I simply select a Polyframe and modify it with the Inflate deformer and Inflate balloon. See the supplied video file for Group Loops.

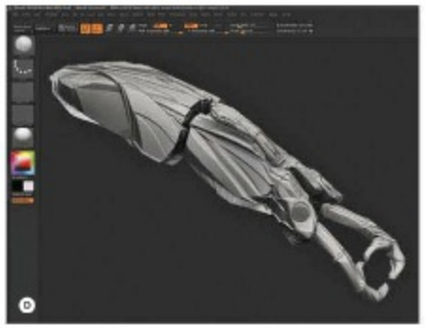
Transforming vehicles

The Lucanus has two modes: an attack mode with open wings, deployed weapons and a threatening appearance, and a cocoon mode where the ship is curved into its shell. This makes it strong and stealthy. As the attack mode is fully open, it's easier to start by creating the battleship in this mode and then fold it into a cocoon after.

To switch to cocoon mode, I move all loose items (wings, clamps, weapons) with the Transpose tool to the nearest surface of the battleship. I then use the deformers (Deformation tab) on flexible areas like the wings so that they curl around the ship. I finish the placement of the wings with the Move Elastic brush.



03 Model the battleship's body The first thing to do is load in your textures – which is the image we've exported from Illustrator. Create a ShadowBox in medium resolution, around 512 pixels. In the Texture tab of the Tool menu, apply the previously loaded image as a texture to your ShadowBox. Then, in the Masking tab, create a Mask By Intensity so that the texture of the ShadowBox is used to retrieve the mask. We can now disable the ShadowBox and start working with the 'hard cut' method – don't forget to Activate Symmetry in X on the Transform menu at this stage **C**.



04 Sculpt some elements With an interesting basic shape established, we can add the elements of the battleship: reactors, weapons, shells and any other specific parts – such as claws, in the case of the Lucanus. For this, we append (SubTool tab) a simple object that we'll distort using the Transpose tool to achieve the volume needed. Then model the object using the 'hard cut' method.

For the claws, append a ZSphere and create a frame that we work on using the Group Loops method. Finish the look with some hard cutting, so that they integrate well with the other elements **D**.

Hard-surface modelling

Pick from several tools to produce consistent results

05 Create the wings For the wings, once again use the image created in Illustrator. Loading it as an alpha enables us to extrude it through the Make 3D tab of the Alpha menu. Work on the wings using the 'hard cut' method to make them look like the other elements of the battleship. Append the wing to the battleship and define the point where it must be attached. Use this anchor point to precisely position the wing with the Transpose tool and add some curve with the options on the Deformation tab (particularly SBend, SSkew and Twist) **E**.

06 Modify the battleship with a rig The claws and mouth aren't open enough, so use the rigging function to distort all the SubTools in one step. Use the Transpose Master plug-in (ZPlugin menu). Activate the option ZSphere Rig and click TPoseMesh. This creates a ZSphere with a ghost of the battleship. Create the rig with the ZSpheres and then go to Tool>Rigging and click on Bind Mesh. Move the ZSpheres to change the geometry of the battleship, then go back to Transpose Master and TPose>Sub. Transpose Master will apply the changes to each SubTool in just one step **F**.

Give a sense of dimension

In space, there is no atmospheric effect. It's difficult to distinguish if your object is a small battleship placed in the foreground or a huge one located thousands of miles away. It's therefore important to add in one or two elements that illustrate your battleship's size. I've added doors to the sides of the Lucanus to show that the vehicle can also carry numerous other vessels.

You can also help readability by overlaying elements: if the reactor flame of a small spacecraft passes in front of your battleship, your mind will interpret that the battleship is located on the background, and is therefore much larger.

B Create the basic shapes in Illustrator so we can build variations with ease

D At this stage the basic structure of the battleship is complete

G If we hide the battleship, the pipe structure should bring up its outline

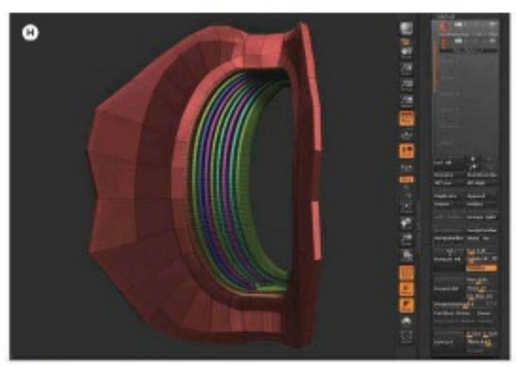
C Load the image as a texture into the ShadowBox provided

E Wings are not totally flat, so give them a slight curve

H Retopology can help you get more accurate and lighter objects

The rig in the battleship will distort all SubTools together

07 Add detail with pipes Append a ZSphere inside the battleship and create a web frame (with X Symmetry enabled) by going in and out of the battleship's surface. This adds density to some key points – the junction between the body and claws, for example – and highlights the strong lines of the battleship. Once the basic armature is complete, turn off X Symmetry and add some more pipes. Then use the Group Loops method to finish the look of the structure **G**.



08 Retopologise the model The jaw area should be more detailed, but we don't want to subdivide the entire model. So instead, we'll retopologise. Open a new ZSphere, select Rigging in the Tool menu and click on Select Mesh to open the battleship as a ghost. Then go into the Topology options and click Edit Topology. Create the new topology directly on the model and, when the new jaw is ready, go to Tool>Adaptive Skin and then Make Adaptive Skin.

We can now increase the polycount of the new part and finish up with the Group Loops and 'hard cut' modelling methods **H**.

Texture your vehicle

Create fine detail using custom brushes

09 Add detail with the MicroMesh tool We want the new jaw to be filled with a bunch of circular saws. The MicroMesh function in ZBrush is perfect to obtain many recurring items without weighing down your model. Open the new tool we created, select only the part where you want the saw detail and hide the rest of the object. Now create a new SubTool from the visible section – normally it should look like a skin that is placed just above the model. In the Geometry tab, click on MicroMesh to select the object that will replace each polygon of the mesh I.

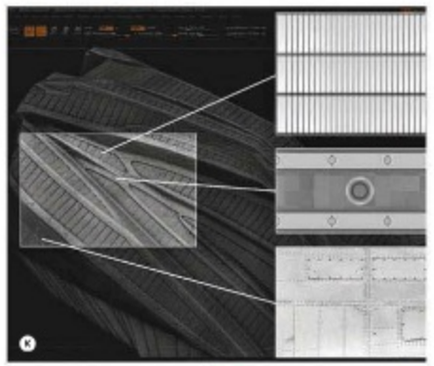
I

10 Masks and deformations Mask each part of the model with the Mask By Smoothness function (Masking tab) with a low range and a high falloff. This will mask a thin line along the edges of the model. Then, with the Grow, Blur and Sharpen Mask options, widen the mask until it becomes thick enough around the edges. Then use the Inflate deformer (Deformation tab) to slightly lower the unmasked parts into the structure. This gives us a structure in two levels that can be textured independently with your brushes J.

10+ hours creation time
Image resolution: 6,000 x 3,500

J

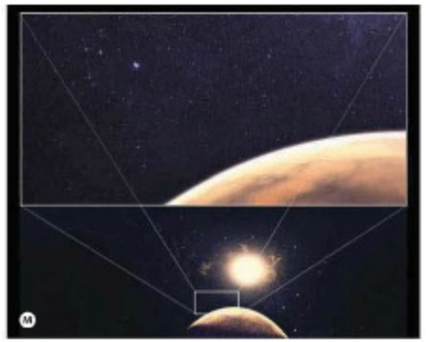
11 Detail with custom brushes We can now use custom brushes (supplied) to add detail between the two parts separately masked. The contour will be made of rigid plate steel and the inside will be made of thin strips. The wings should look like they are made of small plates that slide when they close. For all these details, use the default brushes in ZBrush (mostly in the Scales and Pattern directories). Choose one where the flow matches what you're looking for and change the Alpha to images created in Illustrator or Photoshop (files supplied) K.



K

12 Add matter with Noise Use the Noise function to give matter to small parts of the ship. Noise is not as realistic as custom brushes for objects that have large flat surfaces (like wings) but it is very efficient and fast for small objects such as pipes. In the Surface tab (Tool menu), click on Light Box>NoiseMaker to bring up the Noise presets and then select the one that comes closest to what you want. We want to add rust to the pipes, so I choose Noise04. From the Surface tab, click on Edit to customise the noise effect L.

L



M

13 Use a background as an environment map Create a LightCap so your battleship is well integrated in the final image. I make the background for this illustration using Vue, since it enables planet rendering as well as spherical rendering to use as environment maps in ZBrush. In ZBrush, in the Background tab (Light menu), load your environment by clicking on Texture. Make sure the framing of the environment is the same as the background of the final illustration, and click the LightCap button (the Reflect option must be enabled). The LightCap just created is editable as a MatCap from the Material menu M.

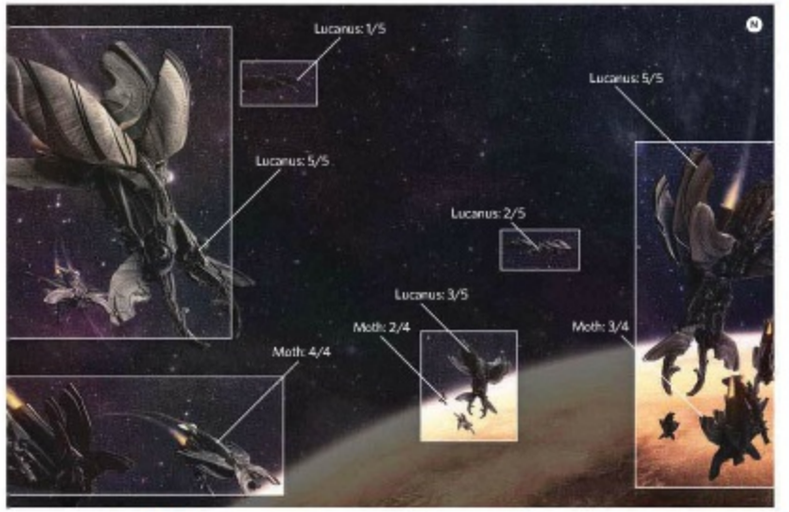
Create a mask with Illustrator

When I change my object mask with the Grow, Sharpen and Blur mask functions, the corners between the edges can be rounded and I may need a sharper result.

I Print Screen my model from above and from below (by disabling the perspective). I can then paste the screen grabs into Illustrator and draw my mask on top. I'll then export the image to use as an Alpha with my Mask tool. This method takes a little longer, but the result is more accurate. Furthermore, if I have to clear my mask, it will be easier to recover it.

Render in ZBrush

Use BPR to capture lots of vessels for a space opera mash-up!

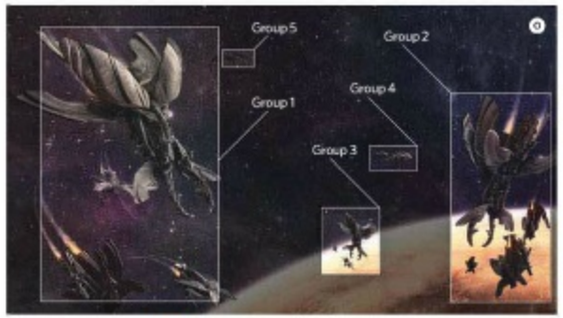


Use your Normal map in Photoshop

I want the hull of the battleship to reflect the lights from the reactors of small starships that revolve around the main ship. To do this, I realise a BPR with the NormalRGB MatCap included in ZBrush. Once in Photoshop, I can then create a Radial Gradient placed on the light source (the reactor of the small starship). I select a colour range on my NormalRGB render (Selection>Color Range) by clicking on a point that should have a reflection. I add a mask to my gradient with this selection. This way the gradient will appear only on the faces pointing in the same direction.

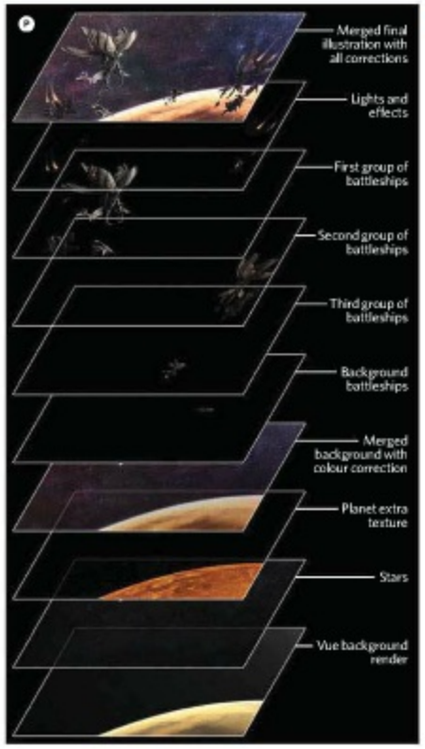
14 Render several battleships We want to create a scene with several starships, but ZBrush doesn't enable BPR with multiple objects. There are several possibilities to overcome this drawback, however. The easiest way is to merge the final battleship and append it several times on the same tool, but that requires a powerful computer.

Instead, make a BPR of your battleship and, in Photoshop, put the render on your background, estimating where to place the second most important battleship. Go back to ZBrush for the BPR and repeat the operation as many times as necessary to gather all the ships you want for the final illustration N.



15 The final composition Equalise your composition to achieve a balanced outcome between your starships. However, when they're moved, even slightly, it can distort their perspective. If the integration seems wrong, go back to ZBrush to render it from the new location.

After some back and forth between the two programs, you'll get the desired result. A simple technique to check that your composition works is to flip the image horizontally in order to check it as a mirrored image. Once in reverse, all the errors of perspective will become obvious. If after this little test everything seems okay, turn to the final stage of the image O.



16 Apply the final touches Choose the final look for your image, deciding whether it will be cold or warm, fuzzy or sharp, dirty or clean. Add a few layers of real photographs to give a little substance to the image (dust, starry background, lasers, flares and so on). The Distortion tool, like Puppet Warp in Photoshop, is very useful to give curvature to the trails of reactors, for example.

Once the composition is complete, flatten the image, finalise the colours and perfect the general appearance using Photoshop's post tools P.

J You can get different types of structures by playing with the Mask options

K Add the final details with custom brushes

L The Noisemaker creates organic matter on small objects

M The background of the final artwork and the associated environment map

N The rendering time can be optimised by lowering the level of subdivision for the small background vessels

O Each group of battleships should have a different size for even better readability

P Here is a map of the final composition with all the various types of layers

3DArtist Questions & answers

Welcome to the Q&A section where we answer many technical quandaries in the popular 3D programs, including MARI, 3ds Max, Mudbox, modo, ZBrush & CINEMA 4D

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The advisors

MARI
Daniele Orsetti
http://dayno.it

Daniele is an Italian 3D artist interested in modelling, shading, texturing and various character design. He's currently working at MPC, London.

3ds Max
Digital-Tutors
www.digitaltutors.com

Digital-Tutors teaches the people who make movies and games. It houses the world's largest CG, 3D, animation and VFX training resource.

Mudbox
Luis Santos
www.luissantos.net

Since an early age Luis has been interested in strange concepts. He started out drawing and painting, but new technologies quickly changed that.

ZBrush, modo
Richard Yot
www.itchyanimation.com

Richard is an illustrator specialising in making quirky characters and worlds. He enjoys giving his CG work some of the charm of handmade things.

CINEMA 4D
Sinan Buyukbas
www.visualreact.com

Sinan is a motion designer and 3D artist focused on CG audio and visuals. He enjoys design processes and finding creative solutions for challenging ideas.

Send us all of your 3D problems and we'll get them sorted. There are four methods to get in touch with our team of expert advisors...

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MARI

Texture in MARI

SPECIAL
TEXTURE FLYING VEHICLES

With the Disc
A simple model of a B-2 stealth plane to challenge your texturing skills in MARI

"How do I texture a realistic vehicle in MARI?"

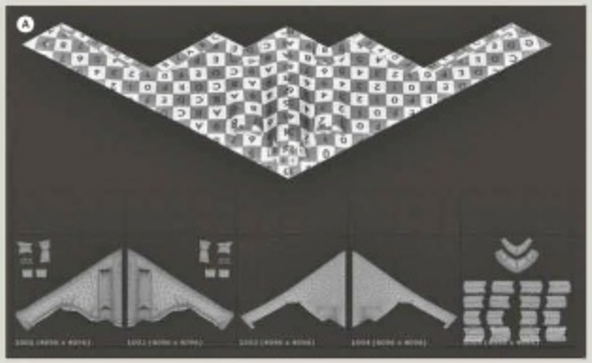
MARI is a relatively new software, but it's quickly becoming the new standard for texture artists in the industry. I use it almost every day at work and it has now become an essential tool in my texturing workflow.

It's designed to work with a vast amount of textures at high resolution, enabling artists to focus on the artistic process without having to worry about the technical issues of working with an object with multiple UV tiles. MARI is very similar to Photoshop for certain aspects: you can directly import PSD files since it uses the same blending modes in its shaders, and most of its image-editing tools and filters will be very familiar to Photoshop users.

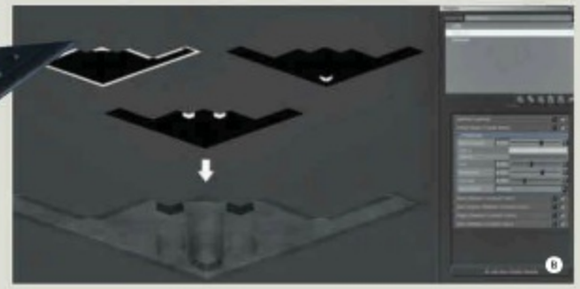
Even though texturing with MARI feels very easy and fluid, it remains very important to plan what you want to achieve before even opening the software. The risk of having too much freedom is that you can quickly get lost in the process. The first thing that every texture artist should create is a well-organised library; a place to keep all the reference images (generic and project-related) and the textures that they can directly use and project onto the model. It takes some time in the beginning but it's totally worth it, since it prevents you from having to leave the software and look for more references, losing you time and concentration.

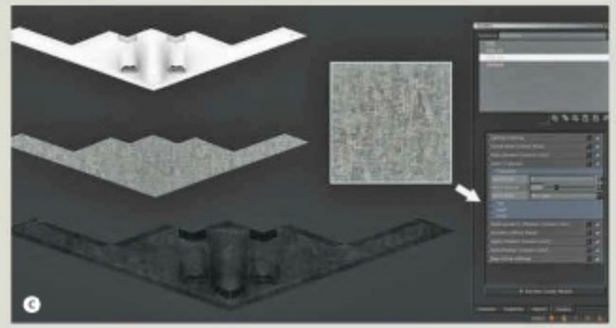
It's also very important to keep the workflow as non-destructive as possible, especially if you're part of a team where other people rely on your work. It's also a huge time-saver, since it's hard to predict what your client or supervisor will ask you to modify next.

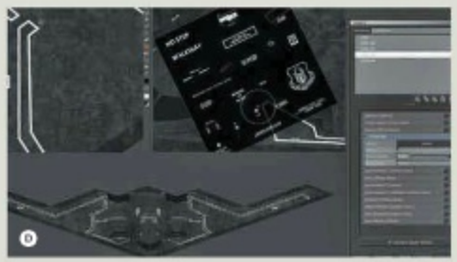
The most efficient way to proceed is to analyse the texture you want to re-create and divide it into layers (or channels, in MARI), so you can have a lot of control on the different aspects of the colour. If you keep things separated it will also be easier to reuse those layers in the creation of the secondary maps, such as Bump, Displacement and Specular.



In this tutorial we'll discuss how to create a quick texture for a stealth plane and how to set up MARI in order to maintain a flexible workflow.







01 Gather your UVs and texture references

First import all the references and the textures we'll be using into the Image Manager, so that everything is one click away. To get the most out MARI, always make sure that every piece you're about to texture has some UV co-ordinates. MARI is designed to work with multiple UDIMs: in this tutorial we'll use five tiles A

Mind the Paint Buffer

MARI projects all the painting and images you create onto the geometry through a Paint Buffer. The Paint Buffer works like a transparent plane where you paint and edit your textures before baking them to the mesh and its UVs.

It's very important to set an appropriate resolution of the Paint Buffer before starting work. If you're working on 4k textures but you're using a 1k Paint Buffer to project your painting onto the geometry, you will end up with some very low-resolution bakes. Before or after you paint on it, you can also move and stretch it using the Transform Paint Buffer tool.

02 Add a base colour

For the base colour, create various Masked Constant Colour shader modules. I then create different Scalar channels and use them to mask the flat colours in the shader. In this way everything remains quickly editable, if needed. To create a quick colour variation and make the base more interesting, add a Fractal Noise shader module and blend on the other layers in Overlay mode with an Opacity of 60% B

03 Bring more detail

MARI gives you the possibility to create a vertex-based ambient occlusion very quickly; you can then use the result as a mask or bake it to a channel. Here we'll use it as a channel and multiply it on the other layers. To create a higher-frequency colour variation, add a Tri-Planar shader module to project a metallic pattern seamlessly onto the geometry. Use a Hard Light blending mode to mix it with the other layers C

04 Use lines and Decals

To add the lines, create a new Black channel and set it to Screen. Then switch to the top orthographic view and paint them by Shift-clicking all the corners – in this way MARI will create only straight strokes. For the other Decals, create a 4K map in Photoshop with all you want to project in it, and then use the Paint Through tool to project them on the mesh. Once done, copy and mirror the right side to the left side in the UV space, to speed up the process D

05 Apply displacement

For more control of the displacement, instead of drawing lines in MARI, create a new channel, fill it with a 50% grey and then use the Camera-layered Painting Unproject function. In this way MARI creates a PSD file with a screenshot of your viewport and sends it directly to Photoshop. Create the displacement lines using paths and reproject them onto the model using Camera-layered Painting Project from the same menu. You can also preview the displacement in the MARI viewport using Displacement or Bump shader modules E

06 Bring in a Specular map

Having all the colour components already separated in layers, it's now easy to create a Specular map. Duplicate your shader and use the components that we've already created to generate a black-and-white map. In particular, reuse and contrast the Fractal Noise and the Tri-Planar modules. If you want you can also add other non-colour-related channels to enhance the interest of the shading F

Rig wings ready for animation

3ds Max

With the Disc
- Three hours of detailed training on creating animation-friendly wings using proven rigging techniques
- Helpful tutorial project files

What's the best approach to rigging wings in 3ds Max?

Wings are a fascinating and complex mechanism. Knowing where to begin when rigging wings and understanding the various types of controls a wing needs to behave naturally are key elements of creating believable and seamless wings. Before even opening 3ds Max, we can save time for ourselves – and our animators – by asking: How much control will animators need in order to convincingly replicate the movements of a wing? Can any of these movements be automated in some way for animators to save time with an efficient control system? These and more questions will be answered as we rig wings in 3ds Max.

Before a bone or control is even made, we must first plan. This involves gathering as much reference as you can find, whether it's in the form of images, video or studying birds at a park or zoo. Great reference is absolutely critical if we are to successfully mimic a wing's behaviour.

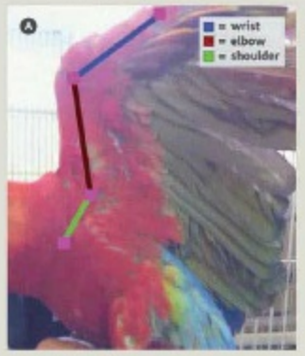
With reference material obtained, we will have direction and will be able to note how specific areas of a wing function to make sure our rig is capable of producing the same results. This will ensure that you start your project on the right path.

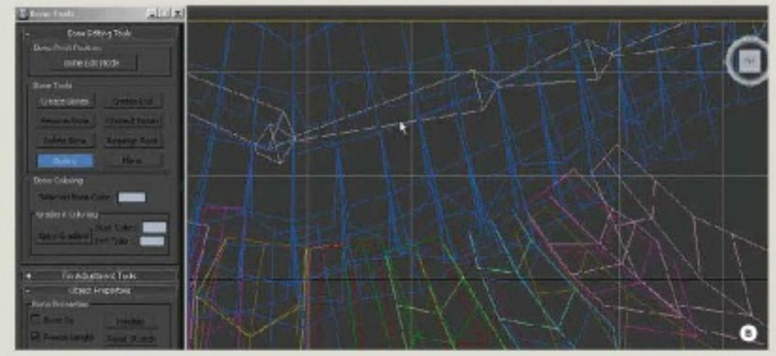
At this point, we are ready to begin rigging the wing. It's a good idea to start with building and enveloping to the skeleton first, verifying that each bone is properly placed before a single control is made. If this is not the case, we run the risk of creating a rig that produces unnatural deformations – which means that more time and money is spent on fixing the problem, when it could have been avoided in the first place.

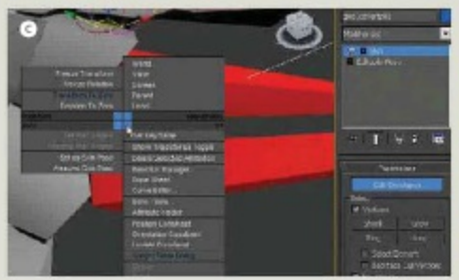
After enveloping has been completed, we can then start to add controls. It's best to work on the core system first, which includes all of the primary controls. Then we can add finesse with secondary controls that animators will use to enhance the realism of the wing. It's important to consider how each control will function – especially auxiliary controls – at the preliminary stages of implementing your control system. This will help prepare for setting up additional, advanced systems throughout the rig's development. This is also one of the reasons why the planning phase is so important, as it offers foresight into this development stage and prepares us ahead of time for certain challenges that we might face.

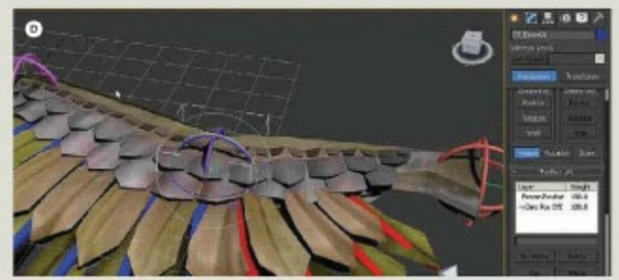
01 Study references

Before starting on any rig, we should find as much reference as possible. Reference images will act as our guide and support, adding clarity to anything that may be obscure. They can also give us further ideas for controls we might never have thought to add. It's a good idea to search for anatomical reference of bone placement, as well as a lot of video reference, to give you an idea of how the mesh is expected to deform A.









02 Set up the skeleton of the wing

After gathering enough reference material, we can now confidently create the skeleton for our wing. Take your time during this step and rely on the topology – which will be the edge flow – of the mesh so that each bone is placed accurately for natural results as the wing deforms. Remember that 3ds Max's Bone Tools dialog can be used to create, reposition, reshape, recolour and add resolution to a bone system B.

03 Envelope the structure

After the wing's skeleton is set up, its geometry is ready to be skinned to it in order for the wing to deform. Initially after skinning, the deformations may not look ideal. Tools like 3ds Max's Weight Table can be used to specify how much influence a bone has over a given vertex. Skin weights can also be reassigned interactively using the Paint Weights tool. Consider using both tools to refine deformations efficiently C.

04 Create the wing's primary controls

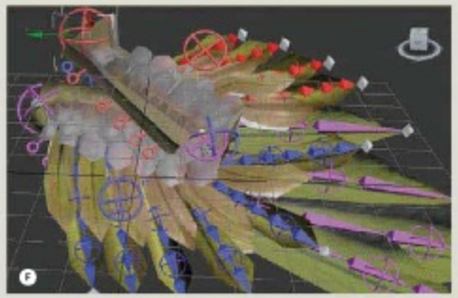
To ensure that the process isn't overwhelming, it's best to add controls one level at a time, starting from a foundation until the rig is sufficient for the animator's needs. This foundation involves adding manipulators to transform each section of the wing. Our primary controls are responsible for the core movements of the wing, such as the wing flaps. Later, they will also be used to help automate certain complex wing mechanics, like its folding and expanding behaviour D.

05 Add secondary controls

We can only get so far by animating our primary manipulators, and we'll notice a problem with the wing missing its natural flexibility. Here is where adding an auxiliary control set can really be a lifesaver. These secondary controls add more resolution to the control rig and include micro controls to bend the wing, as well as controls to fan, twist and ultimately loosen up the feathers in order for their movements to be lifelike E.

06 Use automation

There are some movements that would either be very difficult or cumbersome to animate. The collapsing and expanding of a wing is a great example. Without automating this behaviour, it would be tedious to animate – and could make our animators very unhappy. Thankfully, 3ds Max offers great tools like the Reaction Manager to set up custom parameters for automation. If done right this can save a lot of time and the more it's added to rigs, the happier animators will be F.



Take advantage of 3ds Max

There are many repetitive tasks when it comes to rigging and working with 3D in general. These situations call for 3ds Max to be customised in order to cut down on the time taken on repetitive tasks. 3ds Max has the Quad menu system, which can easily be customised to hold a set of tools you'll use often in your process. Apart from making it easier to access what you need, tools can be built with MaxScript to help mitigate the time it takes to carry out certain actions that would otherwise be dull.

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3DArtist Questions & answers

Welcome to the Q&A section where we answer many technical quandaries in the popular 3D programs, including MARI, 3ds Max, Mudbox, modo, ZBrush & CINEMA 4D

Mudbox

Zombify a face

"What's the best way to transform a human character into a zombie?"

Mudbox is a great program to model and texture within the same interface. It's easy to use and the learning curve is steep as most methods are just a Ctrl/right-click or a quick menu lookup away. Once you find your feet you'll feel much more confident with the package. One of the benefits of Mudbox is being able to see the impact of your textures and sculpting in a Photoshop-like layer structure, which is quite powerful for tweaking and playing with different possibilities in a totally non-destructive way.

This tutorial assumes that you have a human subject to use as a reference; you'll need a shot of the front, right, three-quarter and back views of your subject, and these photos will provide essential references for the later stages.

We'll also assume that you have modelled your base head mesh, keeping references close to mind. I've taken the time to model my own head from scratch, but if you'd like to jump right into Mudbox you can use the default Basic Head mesh provided with the software. This base mesh already has UV maps laid out, so you can start sculpting and texturing.

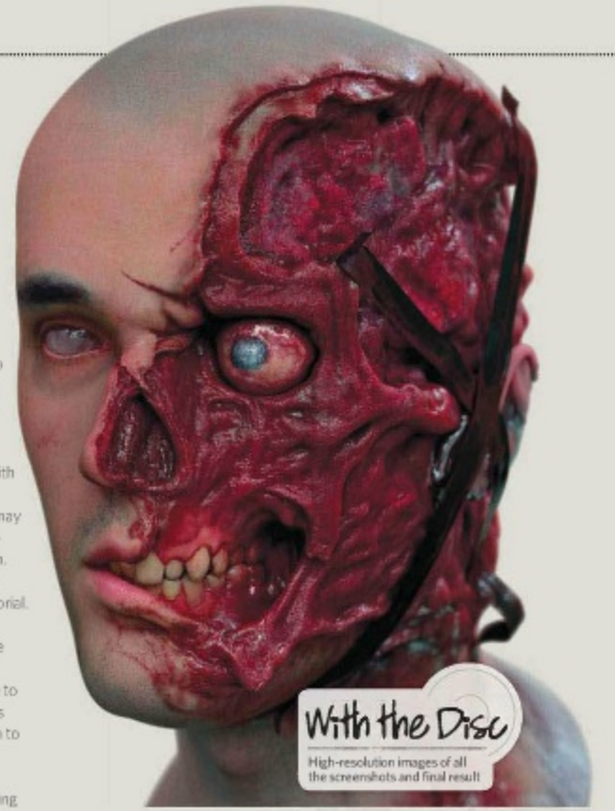
Mudbox enables you to project the photos as a stencil facing the model, providing a base texture for the face. The more you match your sculpture with your reference photo, the better the stencil-projection results will be. You may have to retouch a large area in order to accomplish a seamless texture, though. Mudbox brushes will assist you in this task, as we will detail further in the tutorial.

Since the model will be a partially torn-up face, you'll have a chance to be creative with regards to the raw and bloody portion of the face. A tolerance to gore is required during research for this kind of effect! I have personally chosen to zombify half of the face, but you can sculpt decayed areas throughout the whole face in separate Mudbox sculpting layers. This enables you to keep a healthy face beneath the layer stack and work in your zombie's details without losing the original face reference sculpture.

Vector Displacement maps as stamps

You can use Vector Displacement maps to save and reapply intricate sculpting steps with a single stamp. For example, consider a larva erupting from the zombie's skull, with full details of torn-up flesh around the critter. If you'd like to sculpt many critters throughout the skull, a stamp containing such Vector Displacement information would be useful.

Open a new scene, go to Create>Mesh>Plane and sculpt all the details you'd like to reproduce. Afterwards, choose Maps>Extract Texture Maps>New Operation and select Vector Displacement Map. Define a file name in the Output Options (make sure the file name ends with '_vdm') and click Extract. Now you can add a stamp and choose your VDM image as the source. Your new stamp will now be available for you to apply multiple times throughout your sculpting stage.



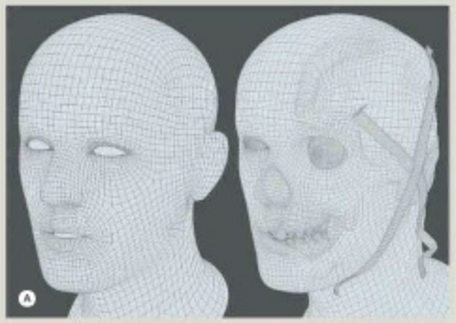
With the Disc

High-resolution images of all the screenshots and final result

01 From human to zombie

To better sculpt your head mesh according to your reference photos, you can take advantage of Image Planes. Select the Object List tab on the right, pick a camera (Perspective, Top, Side or Front) and choose its Image Plane node. The Image Plane settings enable you to import the desired photo and adjust its scale, rotation, depth and opacity within the scene, giving you a steady reference. I start out with a full head, then cut out and reshape the right half in the base mesh model, setting out the basic topography for the bare flesh. You may, however, keep your base head mesh intact and create all the zombie damage in multiple Mudbox sculpting layers. This way you can always revert your zombie sculpting to its healthy state in any given area.

While sculpting damaged skin areas you may deem it useful to prevent yourself from accidentally affecting healthy areas; you can achieve this with the Freeze sculpting tool A.



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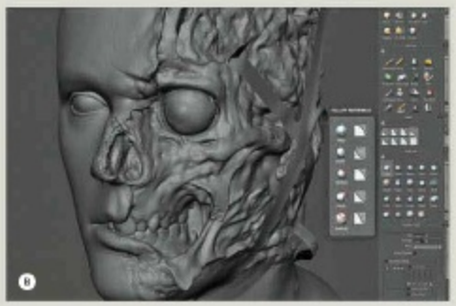

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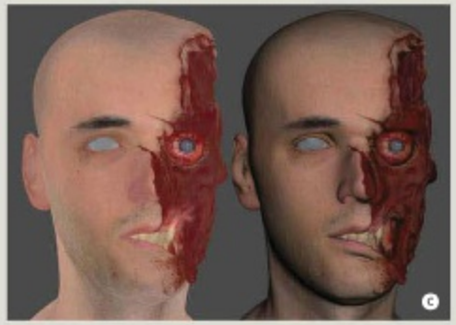

C

D

E

02 Sculpt the details

Most sculpting tool names are self-explanatory in Mudbox, and to sculpt the damaged zombie flesh and muscles I mostly use the Wax, Smooth and Knife tools. Adjust the Strength value of each of the tools to your requirements.

The default stamps are usually sufficient for finer and recurring details. For skin-focused sculpting, I frequently use the bw_pores, bw_skin03, bw_dots and bw_rubble stamps.

Mudbox provides you with a simple and effective set of tools. Practise your stroke flow, smooth out any undesired trembling results and most of all have fun, it's a 3D zombie after all! After the sculpting you may find yourself with a result similar to the image shown B.

03 Texture your gore

I tend to paint my skin textures directly onto my models without photo sources, however, this tutorial aims towards a more realistic approach, so we're using a photo-based texture projection.

Select the Stencil menu and add the reference photos as new stencils. Create a separate paint layer and carefully use the Projection tool to paint your textures via stencil. Make sure you pick white as your tool colour. If you don't, the projection will appear to be tinted.

To remove any visible seams and soften the texture transitions, make use of the Clone Brush and Paint Erase tools. I achieve a good level of blending by picking adjacent colours with the Eyedropper tool and painting with the bw_cliffFace stamp, while toggling the Randomize option for even greater diffusion. The stamps mentioned during the sculpting phase may also prove useful as painting tools here, so experiment and see what works.

You can alternate between Mudbox and Photoshop to enhance your painting with blood splatter Photoshop brushes, for example. Just select File>Export Screen Image to PSD. You can then apply your changes to the exported paint layers. Once you hit Save and return to Mudbox it will prompt you to re-import your changed file. The results are shown in the image C.

D

04 Cavity maps

Mudbox really comes into its own when it comes to extracting Occlusion and Cavity maps. It's also great when creating an image file with a high-contrast representation of sculpted details, including crevices and pores.

To reflect all of your sculpting work in your textures, you should extract a Cavity map from your detailed model and use it as a foundation for your Diffuse, Bump and Specular maps. Select Extract Texture Maps>Ambient Occlusion Map and tweak the Advanced settings in order to achieve either an Occlusion or a Cavity map. To achieve a sharp Cavity map, extract it with a low Filter value, such as 0.00010. You can use a higher value to soften the results or you can soften only the details that you desire with the Mudbox Blur tool D.

05 Specular maps

Mudbox automatically generates your Cavity maps onto the Diffuse channel of the Layers panel. Now you can define the highlighted areas of your texture, like the raw sections, which would usually have more of a shine to them than healthy, unaffected skin.

We can achieve dynamic highlights with Mudbox's Specular Layers channel. Start out by importing a simple, solid grey-coloured image, the full size of your UV Layout map. Consider it the starting point of your specular definition – a low-light base for the image.

Duplicate your Cavity-map layer and drag the duplicate to the Specular channel. Keep it on top of the basic grey layer in Multiply mode. Create as many paint layers as you need on top of that.

I paint with light-grey strokes onto layers in Soft Light mode. This will create a plastic-looking visualisation of the lighting, but you can alternatively preview your model in an HDRI environment in Mudbox or in the final rendering software of your choice to see how it will look. During rendering, the software will use your Specular map in conjunction with any defined environment settings, providing accurate lighting calculations E.

06 Export your maps

For each channel in your Layers panel, Ctrl/right-click any layer and choose Export Channel to PSD. This will create Photoshop layered files with your texture work, which you can then make further changes to if needed.

Open your 3D rendering software of choice and set up your scene with the model and Texture maps. Most of our final maps are shown in the image F.

3DArtist Questions & answers

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ZBrush, modo

ZBrush to modo workflow

How can ZBrush and modo speed up workflow to create complex organic models?

With the combination of ZBrush's DynaMesh and modo 601's retopology tools, artists now have one of the best workflows possible for creating complex organic shapes that in the past would have been very time consuming to create.

ZBrush can be used to create the initial forms by sculpting from a DynaMesh Sphere. Because of the advances that have been made in the last couple of years in sculpting technology, artists are now free to sculpt shapes without topological constraints, so you can concentrate on the much more important and artistic aspects of form and volume rather than worrying about how your topology is laid out. This workflow also enables very complex models to be created relatively easily and quickly, compared to the older workflows that were based on polygon modelling.

Another big benefit of this approach is that it makes it much easier to use less precise references. A polygon modelling workflow requires very good reference images used directly in the viewport as a template for your shapes, and having to work in multiple views against the reference makes for a very slow and cumbersome process. A sculpting-based workflow means you can use ordinary photographs for reference and sculpt in a more traditional manner rather than having to place polygons. The time saved by this approach is considerable and the work is much more enjoyable.

With the initial form completed in ZBrush, the model can then be taken into modo for retopology. The big benefit of this approach is that it breaks down the task into two distinct steps, each with a specific purpose and, despite what you may think, it makes the job much quicker and easier. The initial sculpt enables you to concentrate solely on form, and the retopology pass is where you concentrate on the technical side. Without having to worry about the underlying form at the same time, you can work much faster and you are also free to change the topology without creating a lot of extra work.

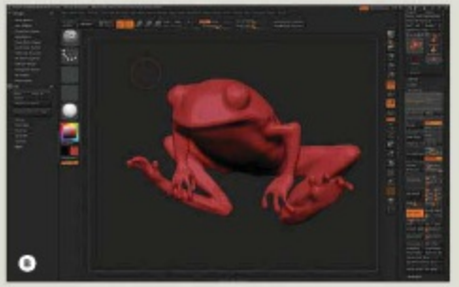
Once the topology is in place you can then return to ZBrush to add the fine details and create the UVs. Finally you can either PolyPaint the textures in ZBrush or use modo 601's excellent paint engine to create your textures. In this instance I'll use modo because I find that the paint engine is much more versatile and powerful than ZBrush's PolyPaint function.

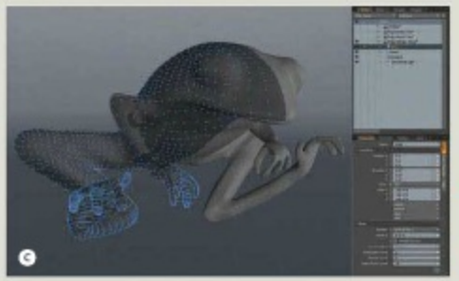
01 Rough the sculpt

Create a DynaMesh Sphere with a resolution of 64; this seems to be the 'sweet spot' for a sculpt of this complexity, giving you enough resolution to build your forms. Use the Move, Standard, SnakeHook and Clay Buildup brushes to create a rough initial form out of the sphere. At this stage I have a few reference images open on a second monitor that I refer to for the forms of the frog A.

02 Refine the form

With the basic forms of the limbs, fingers and head established, the DynaMesh resolution is increased to 128, just enough to add a little more detail. It's very important at this stage not to get caught up in the small details, as this is essentially still a base mesh. The forms are refined into their final shapes, paying close attention to the reference images that have been gathered. The Move and Standard brushes are the main workhorses at this stage B.





03 Retopology

In the Topology tab in modo use the Pen tool to lay an initial row of quads on a new layer with your sculpted frog visible on a background layer. Now switch to the Topology Pen tool and use it to create the rest of the new geometry. In the case of my tree frog, the requirement is a simple model that can be UV-ed, so the topology is simple, but if this was an animation project the topology would need more consideration C.

04 Create UVs

With half the model retopologised the geometry can be mirrored. To create the UVs I initially make an edge selection in modo to define the seams and do a quick unwrap to establish the UV islands.

Then the mesh is imported into ZBrush and UV Master is used to create the final UVs with the Use Existing Seams option. This really uses each program to its strengths; modo for defining the seams and ZBrush for the final unwrap D.

05 Add details

With the base mesh, topology and UVs in place, it is finally time to move to the detailing. The frog is subdivided in ZBrush and details are added using the Dam Standard, Standard and Clay brushes. The toes and fingers are shaped carefully with the Inflate brush and all of the final form is refined until I am happy with the details.

The mesh is then exported as an OBJ and the Multi Map Exporter plug-in is used to create a Displacement map E.

06 Texture painting

Using modo 601's improved painting engine, the frog is textured using 4K maps. Transparent PNGs can be layered in the Shader Tree, just like the equivalent in the Photoshop Layers palette, offering a powerful and flexible painting solution.

The brush engine in modo is very versatile and enables many different effects to be created with the brushes, such as organic skin and fur textures. Material masks, Specular and Bump maps are also created in this way F.

Sculpting and retopology workflow

To the uninitiated, the concept of retopology sounds like an unnecessary extra step, but this is a short-sighted view. Traditional polygon modelling is a very time-consuming process, especially with a shape as complex as this tree frog, and by breaking the job up into sculpting and retopology, an enormous amount of time is saved. The sculpting is a much faster process compared to polygon modelling.

The other benefit of the two-step process is that changes can be made to both the form and the topology of the model without creating huge amounts of extra work, which in production is very important.

CINEMA 4D

How to create 3D type using CINEMA 4D

“What's the best way to create unique typography for a commercial project?”

There are endless solutions when designing type and 3D software enhances your possibilities even further. A little imagination and some basic modelling skills are sometimes more than enough to visualise what you have in mind.

Since the design process builds the foundations of your work, I find it very helpful to start sketching directly in 3D software in order to visualise my ideas and also focus on the final product. The traditional way of sketching on paper and then thinking about how to model it might sometimes make you miss the amazing possibilities 3D software can also offer. From this point of view, CINEMA 4D provides a good set of tools to keep your designs fluid and gives the user a comfortable playground to experiment in.

In this typographic experiment, 'Kandinsky Type', I was inspired by the famous Russian painter and art theorist, Wassily Kandinsky. I was curious to experiment with his use of colour and form his theory in three dimensions. I looked up his paintings and imagined how to build a typographic relation in colour and form.

In this tutorial I will explain the technical workflow I found flexible to create 3D type, simply using CINEMA 4D's very basic key features and the V-Ray rendering engine to achieve a nice and tactile final look. The design process covers modelling, texturing and lighting.

Before my final renders, I also keep in mind the 3D type in an environment. Perspective and light are also essential for an immersive presentation.

01 Sketch in 3D

Assuming that you have found your source of inspiration, your first challenge is to model your type. At this point I suggest you think of each letter as a 3D canvas. You can start to create some letter experiments by using very basic modelling skills. For example, you can use splines and lathe NURBS to create interesting shapes and cloth NURBS to give thickness. Sketch your letters quickly, you will have the flexibility to go back and make refinements later A

CINEMA 4D's most basic features

Keeping your design as fluid as possible enables you to quickly make adjustments whenever you want to go back. NURBS modelling tools, deformers, Mograph module and Boole Objects helped me to keep my design open for happy accidents.

02 Keep your model fluid

To design with NURBS and Mograph tools it's very helpful to keep your modelling fluid. You can find interesting forms just by playing with some sliders. At this point I work with low NURB resolutions for fast navigation and keep each letter in folders organised using the Object Manager B

03 Check your model with a studio light

Once you've finalised your modelling, it's best to make a quick lighting setup and see how your letters work with one another. I suggest you use Global Illumination (GI) and Ambient Occlusion (AO) settings if you are using CINEMA 4D as your renderer. The perception of the forms is very much related to how lights and shadows are rendered at this point. I've used V-Ray for my renders as it renders with GI and AO by default C

04 Get stuck into texturing

Once you've handled the modelling part bravely, your flexible model is ready for colour. Since I worked with booleans, NURBS and cloners along with very basic geometric objects, there is no need to deal with selecting planes or Edge Loops to texture each letter. You can conduct very fast texturing experiments by simply dragging your colour materials into the Object Manager. This is where keeping your design organised in folders helps D

05 Have it your way

When you are happy with the overall design, you can start adding texture details by making various parts editable (keyboard shortcut C). Try using different types of selections by pressing U once you select your plane. For example, U+L is a shortcut for Edge Loop Selection. Using Boole Object is still helpful to achieve some nice cutouts for texturing. Pay attention to your final mesh resolution before making your objects editable E

06 Lighting makes it alive

As a final step, try your design with different lighting setups. Sunlight can make drastic improvements on your final renders as it dramatises the way you perceive colours and forms. You can use multiple sunlight sources with target tags in order to light up your scene in a controlled way. Keep your GI, shadow subdivisions of the lights and glossiness subdivisions of the materials as low as possible for faster test renders. Then set them higher for your final render F

3DArtist Masterclass

Getting geeky again, Jahirul Amin brings us the first of a two-part tutorial showing how to create a control rig in Maya, complete with video tuition

With the Disc
- .ma scene files used
- 3 walkthrough videos

Maya

Create a control rig

"Jahirul guides us through building the controls for a skeleton model"

Here we will create the control rig for the skeleton that we built in issue 44 (.ma file supplied). A control rig can be a separate partition, enabling us to hide the skeleton from the animator to make it more adaptable and flexible. A control that is accidentally deleted can be re-created, and joints and binding information will remain.

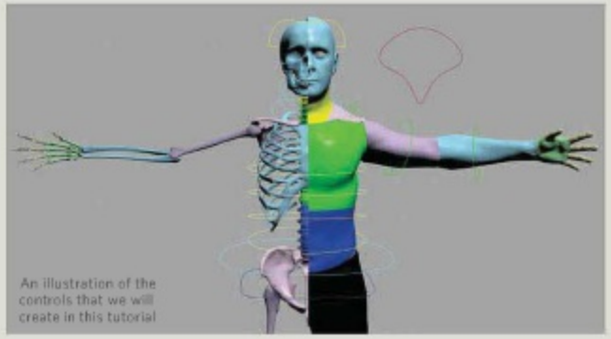
In the first part of the tutorial we will learn how to create the control rig for the torso, head, neck, shoulders and arms. The rest of the skeleton will be rigged in the next issue. But for now, we'll be creating controls for the FK spine, FK/IK blending for arms, adding Space-switching options for the head and arms and finally providing the animator with an auto-scapula, which can be turned off so as not to compromise the animator's decision-making power.

There are some alterations we need to make to aid the creation of the control rig. So we'll look firstly at the creation of the so-called Calamari rig, which you'll see on the first scene file provided. This kind of rig, as its main geometry hasn't been bound, is lighter and faster to use than a bound mesh, enabling the animator to block in motion in real time. Its advantage to us as riggers is to enable us to see how the character will deform and articulate without having to go through the skinning process first.

First, the model is chopped up into its different body parts by selecting the appropriate faces of the mesh and then using the Mesh>Extract tool in the Polygons menu. Next those parts are parent constrained to their relevant joints. For example, the upper-arm (l_upper_arm_geo) is parent constrained to the upper arm joint (l_upper_arm_jnt). This unfortunately will make the rig heavier, so generally we will parent the geometry directly under the joints. Using constraints here will mean that the joint hierarchy is cleaner and more easily understandable.

All of the controls will be made out of NURBS curves, which are easily editable, enabling controls to be customised to suit the character. Also, as they are non-renderable, there's no need to hide them at render time.

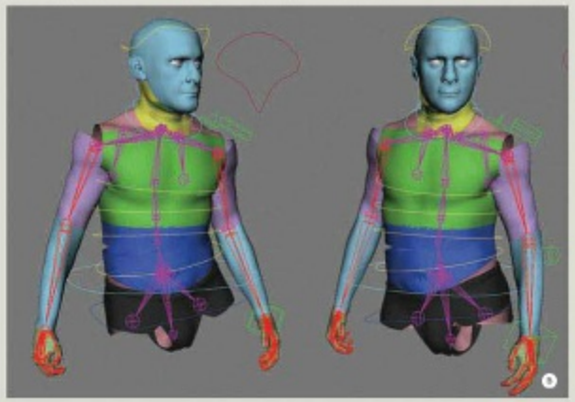
Every control will be grouped to itself twice to create a small hierarchy. The top node (_offset) will be used to position and orient the control. The next level down (_sdk) will be used to add automated controls and space switching. The lowest level is the control curve (_ctrl), which the animator will directly use. It's vital that we use these levels for every control so we can use the _ctrl to put the skeleton back to its creation pose by zeroing out the Translate and Rotate values in the Channel box.

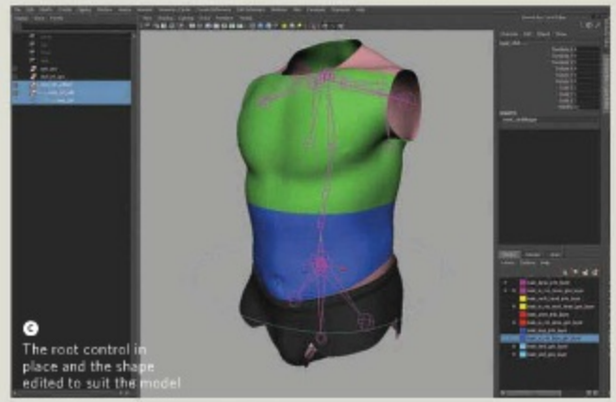


An illustration of the controls that we will create in this tutorial

A A cross-section of the underlying skeleton geometry and the Calamari rig

B Testing is key, posing your character throughout the process can help iron out any issues that arise





C The root control in place and the shape edited to suit the model

Once the control is in position, we can edit its shape to make it easily selectable. Note that we have to shape controls in Component mode rather than in Object mode as this will retain the Translate and Rotate values in the Channel box at 0 and the Scale at a uniform value of 1. Following this, the relevant joint needs to be constrained to its respective control (_ctrl). Last we'll fuse all the parts together using both general parenting and constraints to unite the rig into a whole.

We are going to create FK/IK blending for the arms using a Color Utility called Blend Color, which enables us to set up FK/IK switching quicker than by controlling the weights of Orient constraints.

By the end of this tutorial, we will have a control rig for the majority of the upper body. In next month's issue, we are going to add the hands, the legs, a reverse foot setup and then we'll clean up the whole rig!

Let's start at the root

01 Create the root control

Create a NURBS circle with Interactive Creation turned off so it is placed at the centre of the scene. Rename the circle 'root_ctrl' and hit Cmd/Ctrl+G twice to group it to itself twice. Rename the top group in that hierarchy 'root_ctrl_offset' and the next group down 'root_ctrl_sdk'. Parent the root_ctrl_offset under the root_jnt and zero out all the Translate and Rotate values in the Channel box so the control snaps to the root joint. Unparent the root_ctrl_offset and hit F9 to go into Component mode and scale or translate the vertices of the control to fit around the waist C.

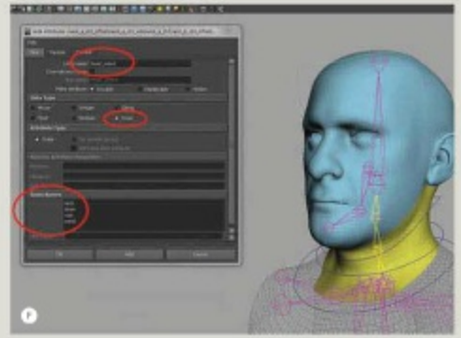
D The control rig hierarchy for the root, hip and spine

02 Torso and constraints

In the same manner, create and position the controls for hip_jnt, spine_a_jnt, spine_b_jnt and spine_d_jnt. Once all the controls are in place and you have edited the shapes so they can be easily selected, we need to create our control hierarchy. Parent spine_d_ctrl_offset under spine_c_ctrl. Parent spine_c_ctrl_offset under spine_b_ctrl. Parent spine_b_ctrl_offset under spine_a_ctrl. Parent both spine_a_ctrl_offset and hips_ctrl_offset under root_ctrl. Select root_ctrl, Cmd/Ctrl-click root_jnt in the Outliner and go Constrain>Point and Constrain>Orient. Do the same for the hip_jnt to the hip_ctrl and for each spine_jnt to its relevant spine_ctrl D.

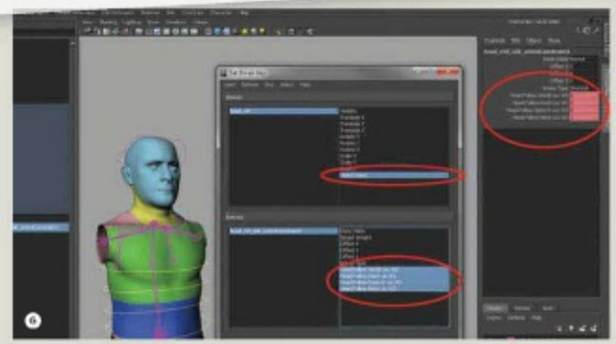
03 Neck and head controls

Like we did for the torso, create and position the controls for neck_a_jnt, neck_b_jnt, neck_c_jnt, head_jnt and edit the controls in Component mode to make them easily selectable. Again, point and orient constrain the neck and head joints to their relevant controls. Parent head_ctrl_offset under neck_c_ctrl. Parent neck_c_ctrl_offset under neck_b_ctrl and parent neck_b_ctrl_offset under neck_a_ctrl. Select spine_end_jnt, hit Cmd/Ctrl and select neck_a_ctrl_offset and go to Constrain>Parent. Create a Locator and rename it 'head_follow_world_loc'. Parent it to the head_jnt and zero out the Translate and Rotate values, and then unparent it. Duplicate it three times and rename the duplicates: 'head_follow_neck_loc', 'head_



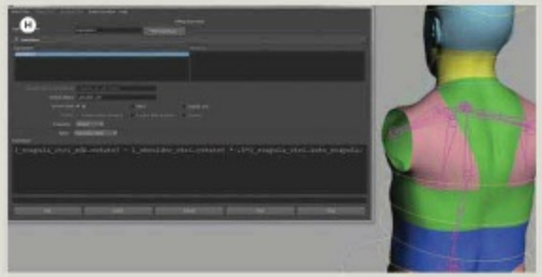
E The neck and head controls in position and the four locators that we'll use for Space-switching

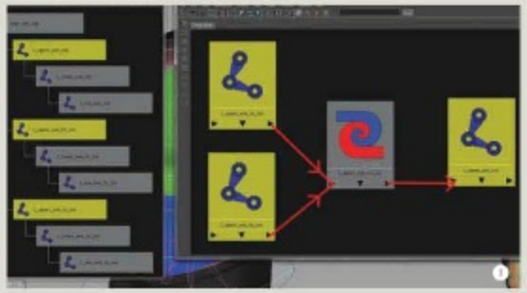
F Adding custom controls for the animator can help them work more efficiently

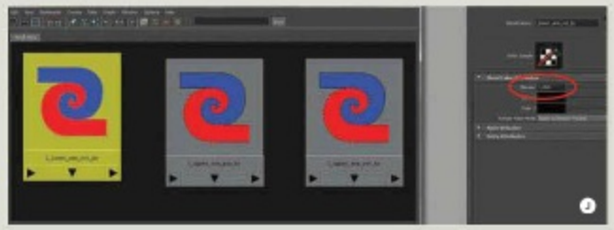


Customising control curves

Making sure that the animator can easily distinguish the controls can help them a lot. Our goal as riggers is to aid their workflow as best we can. Customising the controls in terms of their shape and colour is one way to do this. For example, all FK controls may be created with NURBS circles, and for the IK controls you may use a custom box curve using the Create>CV Curve tool. You can also change the colour of the control curves by going into the Attribute Editor and navigating down to Object Display>Drawing Overrides and checking Enable Overrides.







- G Use Set Driven Keys to drive our custom controls
- H Adding an automation can be good, just make sure that the animator can turn it off
- I The input and output of the Blend Color node used
- J Highlight the Blender attribute that will be used to control the switch between FK and IK
- K Create a custom control to drive all our FK IK blending for the animator
- L The correctly placed position of our l_clavicle_up_vector_loc
- M The hierarchy of the FK arm control rig

+ follow_spine_end_loc' and 'head_follow_root_loc' E.

04 Head Space-switching A

In the Outliner, select all four locators, then hit Cmd/Ctrl, select head_ctrl_sdk and go Constrain>Orient. Parent head_follow_neck_loc under neck_c_jnt. Parent head_follow_spine_end_loc under spine_end_jnt and parent head_follow_root_loc under root_jnt. Select head_follow_world_loc, hit Cmd/Ctrl+G and rename that group 'world_follow_locs_grp'. Select head_ctrl and go to Modify>Add Attribute. Call it 'head_orient' with an Enum Data Type. Create the following four Enum Names: neck, torso, root, world and hit OK. Select head_ctrl_sdk_orientConstraint1, which should be under head_ctrl_sdk, go to Animate>Set Driven Key>Set to load up the SDK window and load the constraint as the driven object. Select the head_ctrl and hit Load Driver on the SDK window F.

05 Head Space-switching B

Set the head_orient attribute on the head_ctrl to neck. Select the head_ctrl_sdk_orientConstraint1, set the Head Follow Neck Loc W to 1, take the other three weights and set them to 0. Highlight 'head_orient' in the top-right of the SDK window, highlight all four Head Follow weights in the bottom-right of the SDK window and hit Key. Next, set the head_orient attribute to torso and edit the weight on the constraint to have 1 for Head Follow Spine End Loc W and 0 for the other three weights. Making sure the head_orient and all four Head Follow weights are selected in the SDK window; hit Key. Repeat this same step for the final two Enums and their relevant weights on the constraint. Finally, select neck_a_ctrl_offset and hit Cmd/Ctrl+G. Last; rename that group 'neck_rig_grp' C.

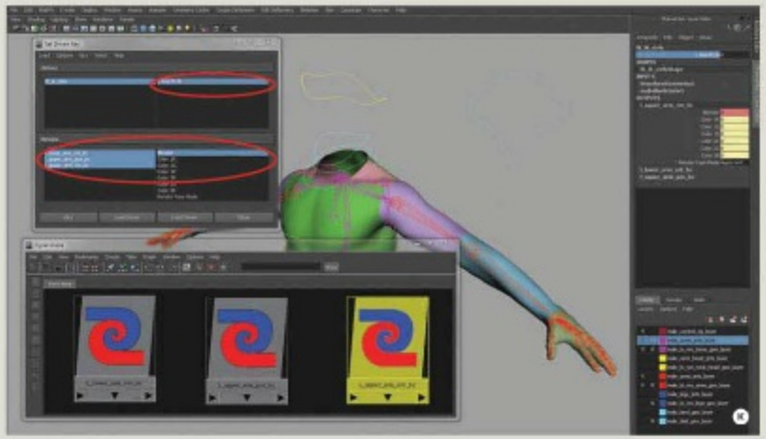
06 Order the shoulder and auto scapula

Create two new controls, 'l_shoulder_ctrl' for the l_shoulder_jnt and 'l_scapula_ctrl' for the l_scapula_jnt. Once both controls have been placed in the correct position using the Offset node on each control, parent l_scapula_ctrl_offset under l_shoulder_ctrl. Point and orient constrain l_shoulder_jnt to l_shoulder_ctrl and l_scapula_jnt to l_scapula_ctrl. Select the l_scapula_ctrl and go Modify>Add Attribute. Rename it 'auto_scapula' and make its Data Type Float. Give it a Minimum of 0, a Maximum of 1 and a Default of 0. Go to Window>Animation Editors>Expression Editor and create the following expression: l_scapula_ctrl_sdk.rY = l_shoulder_ctrl.rY * -0.5 * l_scapula_ctrl.auto_scapula;

Now parent l_shoulder_ctrl_offset under spine_d_ctrl. We'll come back to the clavicle later H.

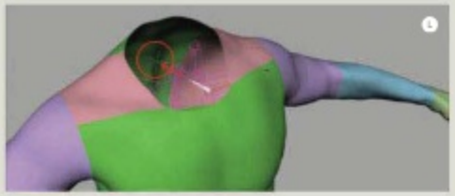
07 FK/IK arms A

Duplicate l_upper_arm_jnt and use Modify>Search and Replace Names to search for '_jnt' and replace with '_fk_jnt'. Duplicate the l_upper_arm_jnt again and rename it to end with '_ik_jnt'. You should now have two extra arm chains that will drive the original chain. Go to Window>Rendering Editors>Hypershade and create a Blend Colors utility node. Rename the node 'l_upper_arm_rot_bc'.



Can't key, won't key

I'm not a big advocate of putting limits on the controls I create. I think it's important that the animator has complete freedom on how far they push a rig. What I do like to do, though, is lock and hide the attributes that shouldn't be keyed. For example, on the majority of the FK controls, the animator shouldn't be able to key the Translate and Scale values. Keeping these out of sight will also make it cleaner for the animator, as they won't have unwanted curves in the Graph Editor.



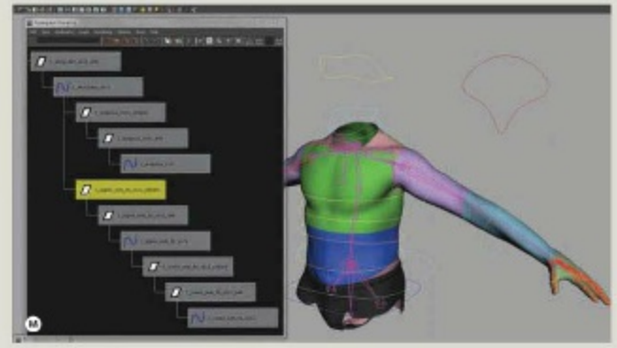
Select 'l_upper_arm_jnt, l_upper_arm_fk_jnt, l_upper_arm_ik_jnt and in the Hypershade window go to Graph>Add Selected to Graph so they come into the Work Area. Connect the output rotate>rotate from the l_upper_arm_ik_jnt into the Color1 input of the l_upper_arm_rot_bc. Connect the output rotate>rotate from the l_upper_arm_fk_jnt into the color2 input of the l_upper_arm_rot_bc. Then connect the output>output of the l_upper_arm_rot_bc into the input rotate of the l_upper_arm_jnt I.

08 FK/IK arms B

Create another Blends Colors node and rename it 'l_lower_arm_rot_bc'. Bring l_lower_arm_jnt, l_lower_arm_fk_jnt and l_lower_arm_ik_jnt into the Hypershade and do the connections again. Make sure to connect the rotate of _ik_jnt into input 1 of the Blend Color node and the _fk_jnt into the input 2. Create one more Blend Color node and again load the l_upper_arm_jnt, l_upper_arm_fk_jnt, l_ upper _arm_ik_jnt into the Work Area. Rename the Blend Colors node to 'l_upper_arm_pos_bc'. This time connect the translate>translate of the ik and fk joints into input 1 and 2 of the l_upper_arm_pos_bc and plug the output>output from the Blend Colors node into the input Translate of the l_upper_arm_jnt. We can now create an FK/IK switch that drives the Blender value on all three blend nodes. When the value is at 0, we are in FK mode and when the value is at 1, we are in IK J.

09 FK/IK Switch

Create a control that will hold all your FK/IK switches, and position it somewhere that will be easy to access and be noticeable. You don't have to create the _sdk and _offset nodes for this control. When you are happy with its position go to Modify>Freeze Transformations to clean up the Channel box. Call the control 'fk_ik_ctrls' and parent it under the root_ctrl. Lock and Hide all the Translate, Rotate, Scale and Visibility attributes for the control. With the control selected, go to Modify>Add Attribute. Call the attribute 'l_arm_fk_ik'. Make it a Float and give it a Minimum of 0 and a Maximum of 1. Select all three Blend Color nodes and go to Animate>Set Driven Key> Key. Select the fk_ik_ctrls and click Load Driver. Set the l_arm_fk_ik attribute to 0 and set all the Blend Color Blender attributes to 0 and hit Key in the SDK window. Now set the l_arm_fk_ik attribute to 1 and set all the Blender attributes to 1 and then hit Key K.

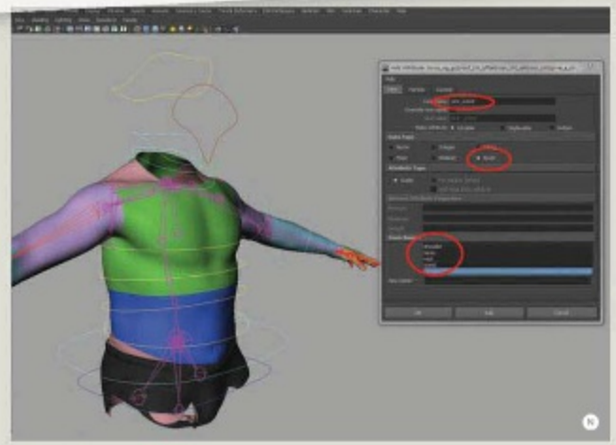


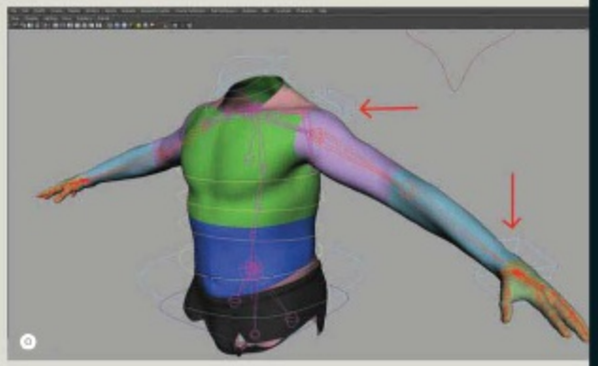
10 Clavicle

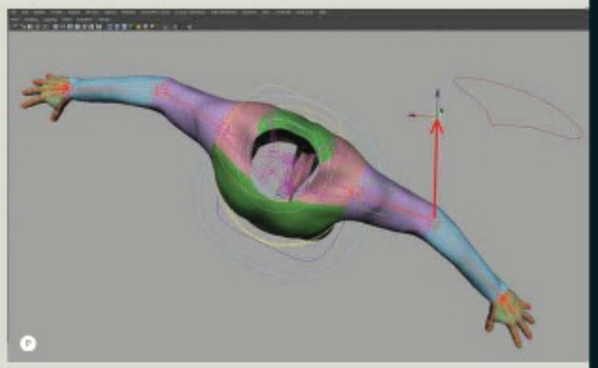
Go to Skeleton>IK Handle Tool (Options) and set the Current Solver to ikRPsolver. Create an IK handle between l_clavicle_jnt and l_clavicle_end_jnt and rename it 'l_clavicle_ik'. Create a locator, rename it 'l_clavicle_up_vector_loc' and parent it to l_clavicle_jnt. Next, zero out all the values in the Translate and Rotate channels and then unparent it from the joint. Select the IK handle to find the direction of the Pole Vector and then translate the locator back in the direction of the white pointer. Select l_clavicle_up_vector_loc, then Cmd/Ctrl-click l_clavicle_ik and go Constrain>Pole Vector. Parent the l_clavicle_ik under l_upper_arm_jnt and then parent l_clavicle_up_vector_loc under spine_end_jnt L.

11 FK Arm Controls

Set the l_arm_fk_ik_ attribute to 0 so we are in FK mode. For the l_upper_arm_fk_jnt and the l_lower_arm_fk_jnt, create two controls naming them 'l_upper_arm_fk_ctrl' and 'l_lower_arm_fk_ctrl'. Create each control's hierarchy as normal and place them in the correct place using the Offset nodes. Once there, parent l_lower_arm_fk_ctrl_offset under l_upper_arm_fk_ctrl and parent l_upper_arm_fk_ctrl_offset under l_shoulder_ctrl. Orient and Point constrain l_upper_arm_fk_jnt to l_upper_arm_fk_ctrl and Orient constrain l_lower_Arm_fk_jnt to l_lower_arm_fk_ctrl. Create a locator, rename it 'l_arm_fk_follow_world_loc' and parent it to l_upper_arm_fk_jnt. Zero out all the Translate and Rotate values and then unparent it completely. Duplicate it three times and then rename each of the duplicates: 'l_arm_fk_follow_shoulder_loc', 'l_arm_fk_follow_torso_loc' and 'l_arm_fk_follow_root_loc' M.







12 FK Arm Space-switching

Select all four locators and then Cmd/Ctrl-click l_upper_arm_fk_ctrl_sdk in the Outliner. Go to Constrain>Orient, change the Interpolation Type on the constraint to Shortest. Parent l_arm_fk_follow_world_loc under world_follow_locs_grp. Parent l_arm_fk_follow_shoulder_loc under l_shoulder_ctrl. Parent l_arm_fk_follow_torso_loc under spine_d_ctrl and parent l_arm_fk_follow_root_loc under root_ctrl. Select the l_upper_arm_fk_ctrl and go to Modify>Add Attribute. Rename it 'arm_orient' and make it an Enum Data Type. Create four Enum Names: shoulder, torso, root and world. As we did with the space switching for the head, do the same here. Use Set Driven Keys to drive the weighting of the constraint using the arm_orient attribute as the driver N

13 IK Arm Controls A

Next, set the l_arm_fk_ik attribute to 1 so we are in IK mode. Go to Skeleton>IK Handle Tool (Options), set the Current Solver to ikRPsolver and create an IK handle from the l_upper_arm_ik_jnt to the l_arm_end_ik_jnt. Rename the IK handle 'l_arm_ik_handle'. Create a control for the IK handle as we have done for the rest of our controls. Call this control 1_arm_ik_ctrl and parent the Offset node of that control to l_arm_ik_handle and zero out the Translate and Rotate values. Once it snaps into position, unparent the control. Parent l_arm_ik_handle under l_arm_ik_ctrl. Create another control and call it 1_upper_arm_ik_ctrl'. Position it in the same place as the l_upper_arm_ik_jnt using the Offset node O

14 IK Arm Controls B

Point constrain l_upper_arm_ik_jnt to l_upper_arm_ik_ctrl. Parent l_upper_arm_ik_ctrl_offset under l_shoulder_ctrl. Create another control; this will be for our elbow. Call this control l_elbow_ik_ctrl. To position this control correctly, select (in this order) l_upper_arm_ik_jnt, l_lower_arm_ik_jnt, l_arm_end_ik_jnt and then l_ebow_ik_ctrl_offset. Go to Constrain>Point (Options), make sure Maintain Offset is unchecked and hit Add. It should snap inbetween the arm chain. Next select the l_lower_arm_ik_jnt and then l_ebow_ik_ctrl_offset and go to Constrain>Aim. Delete both constraints that under the Offset node and, making sure that your Move tool is set to Object mode under Move Axis, translate the Offset node back in the Z-axis P

15 IK Arm Controls C

Select l_ebow_ik_ctrl and Cmd/Ctrl-click l_arm_ik_handle in the Outliner and go to Constrain>Pole Vector. If the arm remains still, the control is correct. Select l_arm_ik_ctrl_offset and l_elbow_ik_ctrl_offset and hit Cmd/Ctrl+G. Call that group 'l_arm_ik_rig_grp'. Select torso_rig_grp, neck_rig_grp, l_arm_ik_rig_grp and world_follow_locs_grp and hit Cmd/Ctrl+G. Call that group 'rig_grp'. Select l_clavicle_up_vector_loc, all the locators used for the Space-switching and all the IK handles and hit Cmd/Ctrl+H to hide them. Repeat Steps 6 to 15 to create the right arm controls Q

N The use of Space-switching for the arm can give the animator more choice

O A cube-like curve for the IK controls lets animators know what mode they're in

P The elbow control is correctly placed using a point and aim constraint

Q Cleaning up the rig can make things easier to come back to later on

Making rigs fit for purpose

There is always more you can add to a control rig. Finding out what the animator needs is crucial to making something that is fit for purpose. Speaking with the animator is the first thing I like to do before creating the control rig. Asking questions such as: does it need stretchy limbs or an FK/IK spine? How does the animator like to work? Do they mostly work in IK mode only? Looking at the storyboard or asking for a character pose sheet can also help inform your decisions. Answering these crucial questions and others can save you plenty of time in the long run and make your workflow and approach more efficient.

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3DArtist

Back to basics

Bernat Cuni shows us how to create basic UV maps & prepare models for 3D printing in colour

With the Disc

Jana.zip, containing: jana.x3d and texture.png

Blender

Prepare models for 3D printing in colour

With 3D printing becoming more popular and cheaper every day, more people want to turn their 3D files into real objects. Here you'll learn how to 3D print in colour

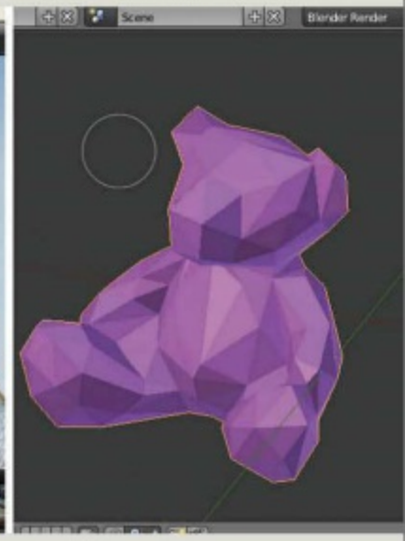
This tutorial will teach you to prepare models for 3D printing in colour. Let's convert your digital creations into real-world stuff – let's turn bits into atoms and do it in brilliant full-colour.

As a background, let me introduce some terminology: 3D printing is a generic name given to different processes of additive manufacturing. Some of them, like stereolithography (SLA), involves solidifying liquid photopolymer with a laser. Another process named Selective Laser Sintering (SLS) melts polyamide powder to build the objects. A common 3D-printing process is FDM, Fused Deposition Modelling, where thermoplastic material is extruded from a nozzle to form layers (think a robot-controlled glue-gun).

3D printing in colour is a bit different as it's closer to how a normal printer works. This process is known as 'powder bed and inkjet head 3D printing' and it literally does that. An inkjet-like printing head moves across a bed of plaster powder, depositing a liquid binding material in the shape of the section of the 3D model. A fresh layer of powder is spread across the top of the model and the process is repeated. When the model is complete, unbound powder is automatically removed. The model is quite brittle once it comes out of the printer and it needs to be infused in a liquid to make it strong and brighten the colours. Some providers submerge the objects in cyanoacrylate (super glue), while others use different formulas to harden the model.

Normally, a well-formed watertight STL file is enough for 3D printing, but if we want to have colour in it, we need to generate a VRML file. Each 3D-printing service provider has different requirements when accepting files for colour 3D printing. For our purposes we will cover the process of creating an X3D file, which is the current successor to the Virtual Reality Modeling Language (VRML) file.

B



To do this, we will first cover a basic approach to verify that our models are printable. There are several tools to do that, but depending on your file size we recommend using a cloud service to get the file checked and repaired remotely, so you don't need to have it installed on your HD.

The core of this tutorial will teach you to unwrap your model and create a UV map of it. We will use Blender for this, which happens to have a helpful description of what a UV map is in its manual. It reads: "Imagine a paper 3D model of an object, e.g. a sphere, that is to be laid flat on a table. Each of the 3D co-ordinates of the sphere can be mapped to the 2D co-ordinate on the flat piece of paper. The purpose of unwrapping the co-ordinates is just to map these co-ordinates to images/pictures so that the 3D image can have a realistic-looking surface with textures derived from these images."

To go through the process of generating the UV-mapping layout and assigning a texture, we will use the base 3D model of my 'Jana' collection, a set of teddy bears that share the same UV mapping but use different textures. If you have done some UV mapping before, this tutorial will refresh some concepts for you. If you haven't got your hands on it yet because it sounds too complicated, then this teddy bear will show you that UV mapping is more or less like being a tailor. You will be strategically cutting fabric (the texture image) to make it into a jacket (the UV map) for a person (the mesh) to wear, with the minimum possible stretches or wrinkles.

Something to keep in mind when turning digital models into physical objects is that in the real world there are some constraints that don't exist in the virtual world; for instance things like gravity and fragility tend to be a bit picky with 3D-printed things. If you are going to print a character, make sure it can stand on its feet; big arms and weapons might easily change the gravity centre and make your model fall flat on the table. Creatures with big wings like dragons might also give problems of stability. One way to solve this problem is to add a base to your models, be it a bunch of rocks or a chair to make sure the 3D-printed object will stand in the desired pose.

By the nature of the 3D-printing process, your object will be very fragile when it comes out of the machine. Before being hardened, your model will have the consistency of a sand castle, so it is good to avoid long unsupported parts like tails or horns, especially if there is a big mass at the end. Normally, common sense is enough to guess how a digital model would behave if it were real, but it's not a bad idea to double-check it with a physics simulator. Place your model on the ground plane, and apply some gravity. Does it stand?

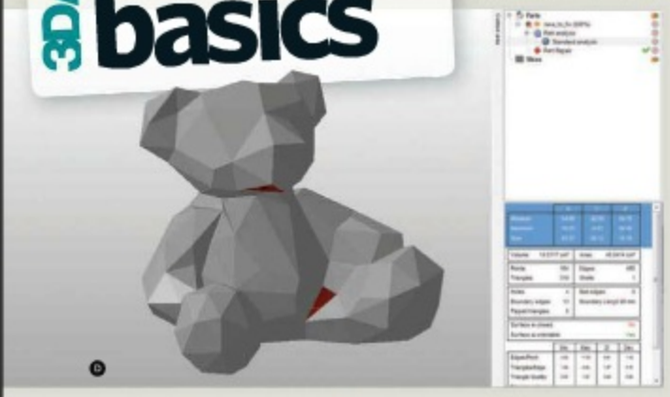
C

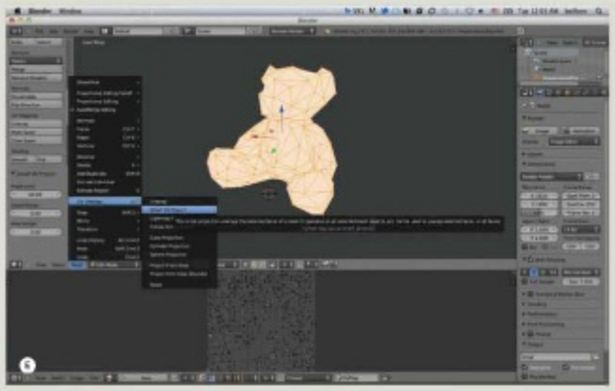
A The UV map of this colour 3D print matches a texture of flat-coloured triangles with the mesh faces

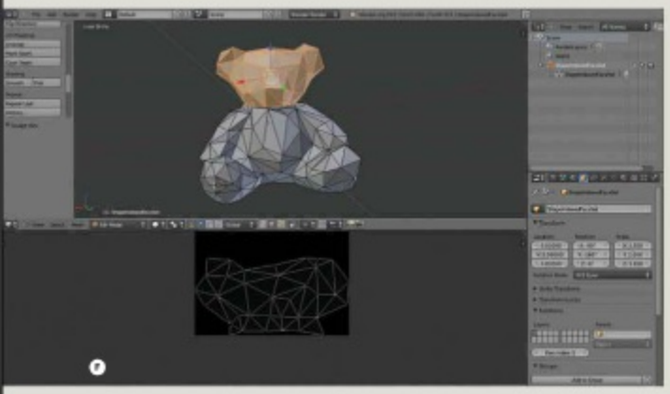
B The model of the teddy bear was obtained by scanning a real teddy bear and processing the mesh to get a low-polygon model completed

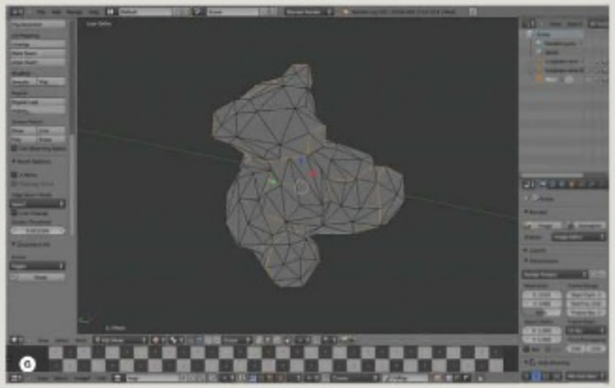
C Once the UV map is defined, you can change the texture file to print different variations of the same model

3DArtist Back to basics









- **D** Mesh analysis and fixing with netfabb Studio Basic. The mesh is not closed as it has four holes
- **E** A case of Smart UV projection
- **F** A UV map for the head only

Turn 3D files into stunning colour models

01 Make a model printable

First, before we do anything else, we need to verify that our model can be printed into 3D. Primarily it should be completely closed (watertight) without any holes. It must also be manifold, which means that no edges can be shared by more than two faces. To achieve this, we recommend using the free software netfabb Studio Basic, which magically fixes almost any given mesh at the click of a button. Just hit the red cross icon and the software will fix your model. You can also find a cloud version of this software at http://cloud.netfabb.com, which completes the same task, but completely remotely **D**.

02 Create a UV map

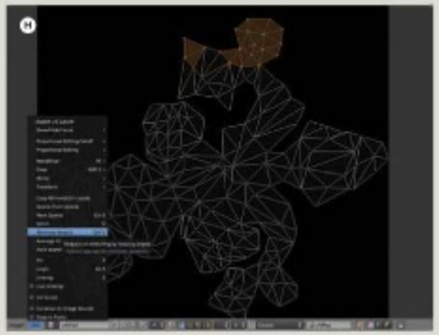
Import your fixed mesh into Blender and load the UV/Image Editor panel. With your model in Edit Mode in the 3D View panel, select your mesh (A) then click Mesh>UV Unwrap>Smart UV project and hit OK. This will generate a UV map that you'll be able to see on the UV>Image Editor panel. Enable Live Unwrapping under the UVs menu in order to see the changes you make on the model reflect on the UV map and the other way around **E**.

03 Multiple UV textures

3D printing in colour accepts models with multiple UV textures, so you can use some images for one part and other images for another part of the object. To do this, you just need to select the part you want to apply an independent UV texture to and create it **F**.

04 Create seams

One of the tricks to getting a good UV map is to know how and where to put your seams. These seams are basically cuts that define a discontinuity on the texture. They are called seams because they behave like the seams on clothing. Think of your jacket as a 3D garment that comes from a 2D fabric with minimum distortion (tight shirts with few seams have higher texture deformation than tailored shirts with well-placed seams). To mark the seams, select the desired edges on the 3D View panel on Edit Mode and click Mark Seam under UV Mapping on the Mesh Tools panel (T). At this point you should see your UV mapping updated, but if not simply generate the Smart UV again **G**.

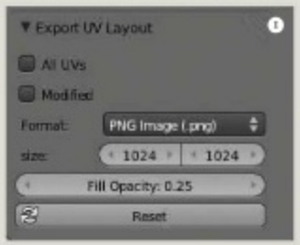


05 Edit the UV map

Once we have a nice UV map overall, we can go into further detail and adjust the wrapped map to our convenience. On the UV>Image Editor panel we can select vertices, edges and faces and transform them as if we were on the Edit Mode on the 3D View panel. Hit A to select/de-select all, G for grab, S for scale and R to rotate. Through the UVs menu you can also specify the general behaviour of the UV map, like minimising the stretch or fit of the whole image **H**.

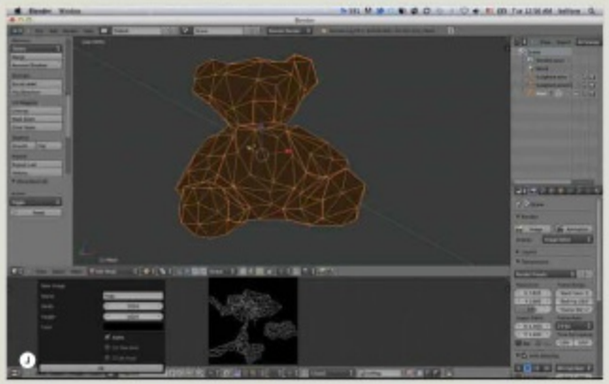
06 Export to SVG or JPEG

When we are happy with our UV map, we can export it as an image or as a vector layout in order to generate textures in other programs. To export, go to the UV>Image panel, click UVs>Export UV layout. In the Export window you can specify if you want a PNG, EPS or SVG. By default, the Fill Opacity is set to 0.25, which is very useful if you want to drop your UV Layout into a new layer in your graphics program and still see what areas it will cover **I**.

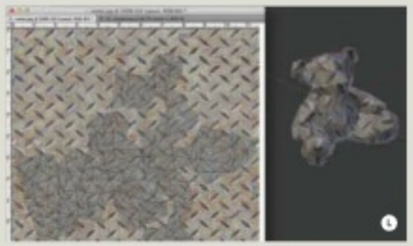


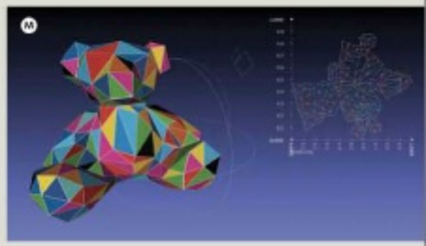
Per-pixel painting

Once the UV map is defined, the texture can be created with a multitude of tools. In this tutorial we focus on exporting the UV-mapping layout in order to use it in graphic- and vector-based applications, because that was the design intent of the 'Jana' collection. To create perfect-fitting textures with detailed artwork, I recommend using per-pixel painting applications like ZBrush or 3D-Coat, which enable painting directly on the 3D model with a high level of control with selection tools, layers and multiple brushes. Other applications that aren't 3D-specific, like Photoshop, also enable per-pixel painting.



- **G** Place the seams on the edges where a real teddy bear would have fabric seams
- **H** Applying very minimal stretch to a UV map
- **I** The Export UV Layout dialog box
- **J** The New Image dialog box
- **K** Create a UV Map texture within Illustrator
- **L** Crop a texture file to the UV map size. This texture image was found online at www.cgtextures.com
- **M** X3D file opened with MeshLab to verify the textures load correctly, and size units are set to metres





07 Assign a texture

Now we need to assign an image to the recently created UV map. On the UV>Image Editor, select the image and create or assign a new file. Generally, colour-3D-printing machines can't handle texture files bigger than 2,048 x 2,048px. This file will be placed in the same folder that the 3D file is. Now you need to create a material using that image as a texture. This step enables the file to identify which image to use as texture and then how to map that image with its geometry according to the UV map **J**.

08 Create textures with vectors

Most modern 3D software packages come with powerful texture-painting features and plug-ins, but since I like to work with vector graphics, I import the UV map to Illustrator as an SVG and then work my way until I get a nice texture. A typical workflow would be to leave the UV layout on a locked layer and develop your graphics underneath, seeing (and guessing) what part of the model you are texturing. Once the graphics are ready, you can export a PNG or JPEG file of your artwork with the same name of the texture you assigned to your UV map **K**.

09 Use photo textures

To use photo textures, just crop them to the size of your UV map, generally 1,024 x 1,024px and giving it the same name as the assigned texture. You need to keep in mind that where you have seams there will be a discontinuity on the texture **L**.

10 Pack your files and print

When preparing your files to send to a 3D printing service provider, generally they will ask for a zip file containing the VRML or X3D model and the texture file. It is important to keep in mind that VRML files have the units in metres, so we need to resize our model before exporting it. Export your file as X3D or VRML and you are ready to send it to print. To verify your file, you can open it with another application and check it shows the texture correctly **M**.

Alternatives to UV mapping

In some cases it's common to use flat colours rather than image-based textures. In this case, if you want parts of your model to be printed in some colours and others with different colours, you can export directly to VRML. Sometimes the 3D-printing service providers develop their own tools to make it easy for customers to submit files for 3D printing. For example, http://i.materialise.com has created a plug-in for SketchUp that sends your 3D models straight to their servers with all the colours and textures. Other providers like www.sculpteo.com accept textured OBJ files straight away.

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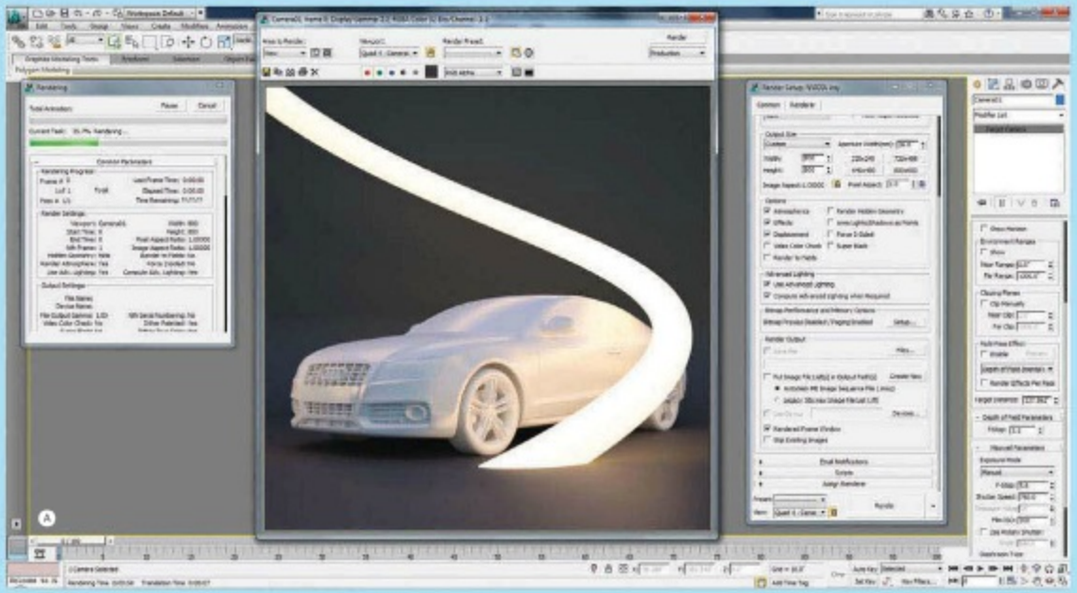

Autodesk Digital Entertainment Creation Suite Ultimate 2013

Autodesk's latest string of updated software suites offers a competitively priced and direct route into the world of the company's industry-standard software

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Autodesk Subscription is quickly becoming a must-have, offering users the opportunity to pay a fixed fee on a yearly basis. Users will also be entitled to free upgrades to the latest software and service packs, access to Autodesk 360 cloud services, flexible licensing terms, technical support and access to previously released packages (2012/2011/2010 and so on) at no extra cost.

Subscription is vastly cheaper than buying upgrades on a yearly basis and is quickly becoming the sensible option.

Autodesk has recently started shipping the latest iterations in its line of industry-leading software suites, incorporating 2013 editions of key programs, from AutoCAD to Softimage as part of various targeted bundles, including the Digital Entertainment Creation, Building Design, Product Design and Infrastructure Design suites.

Each suite is marketed towards a very specific sector (namely architecture, digital entertainment creation, engineering and product design). They also use incentivised pricing as a means to introduce users to some of the other relevant packages Autodesk has to offer – without needing to pay full individual RRPs. The release is a real opportunity for Autodesk to encourage users to begin working across packages – something that the company has been pushing for some time now.

The only slightly questionable industry sector is that of architectural visualisation, which would likely be more suited to the Building Design Suite as opposed to the Digital Entertainment Creation Suite, which is bereft of core arch-vis tools, namely AutoCAD (and also Revit).

Updates are definitely not the name of the game within the 2013 suites and, as many will be aware, Autodesk's 2013 offerings are largely a revision as opposed to an overhaul – with the new core coding making pathways towards what may be considered a more substantial 2014 edition of the various Autodesk packages. The suites are certainly not in existence for the purpose of updating software alone, however. Autodesk's underlying concept is clearly more focused on keen pricing and bringing what were previously thought of as tertiary packages together to form a complete bundle. The hope is that these will be able to work seamlessly together and ultimately accelerate workflow.

The really impressive thing about the Digital Entertainment Creation Suite Ultimate is the flexibility it offers. Users really are able to choose the best tool for the job – choosing between 3ds Max, Maya and Softimage depending on the nature of the project and its requirements. An artist can truly choose the way they like to work and not have to worry so much about compatibility with the rest of the production team, thanks to the FBX format enhancing product cohesion.

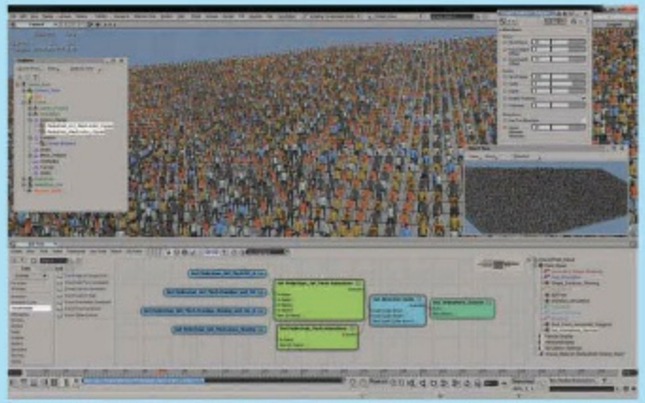
All of the included packages integrate fully using the rapidly developing Autodesk FBX 2013 format, which has remained in the spotlight for the past few years. This has acted as an indicator of Autodesk's intentions, all of which are now realised by way of the suites and interchanging formats working in conjunction with one another.

To take advantage of the greatest possible level of interoperability, the Ultimate package is the best choice – combining the best possible financial saving with both Maya 2013 and 3ds Max 2013, as opposed to the Premium and Standard suites, which are biased towards either one of the killer pair.

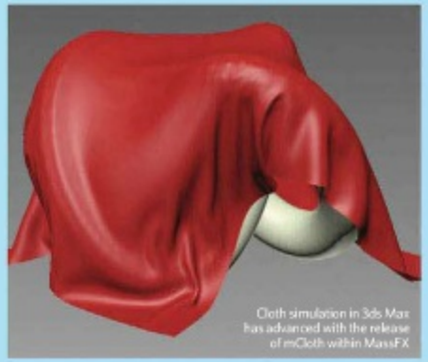
Also included in the suites is Sketchbook Designer and Mudbox, both of which form a key part of the production process, regardless of the preferred core application. The additional packages without doubt form a great complement to the core elements of the suite and add a vast amount of extra functionality, whether for pre-production concept art or adding natural sparkle to a model out of Maya or 3ds Max.

Despite varying press reviews, there are indeed a few notable features to be found in the 2013 product line within the Digital Entertainment Creation Suite Ultimate, particularly within Maya, 3ds Max and Softimage 2013. 3ds Max 2013 now features long-awaited cloth support within MassFX and iray ActiveShade support for example, with a vast number (400+) of legacy bug fixes creating a smoother, more consistent user experience. Maya 2013 features a number of viewport improvements brought about by the Viewport 2.0 technology, resulting in a higher fidelity, more descriptive viewport. Last but by no means least, Softimage 2013 comes equipped with an improved ICE system, set up with the new CrowdFX technology, for creating vast animated crowd systems (exporting to 3ds Max or Maya should the need require).

A 3ds Max 2013 now features ActiveShade support for the NVIDIA iray rendering engine, producing stunning images in record time. Thanks go to Jeff Patton for the demo scene



Softimage 2013 should not be forgotten, with big improvements within the ICE (Interactive Creative Environment) system and a new CrowdFX engine designed to integrate seamlessly with Maya 2013



Cloth simulation in 3ds Max has advanced with the release of nCloth within MassFX

Autodesk 2013 product line

A word of warning: if you are reliant on plug-ins, check compatibility before purchasing a fresh licence of any Autodesk 2013 product, including the suites, as Autodesk has substantially altered the code in many packages – making old plug-ins dead in the water. If you require the use of 2012/2011/2010 products, so as to maintain use of particular enhancements, a subscription is a must and should be considered a necessary cost within purchasing.

Mudbox 2013 also comes better equipped. Utilising the new Gigatexel engine, texture resolution is no longer an issue

The good & the bad

- ✓ Powerful progression of Autodesk's well-known professional software
- ✓ Reasonably priced when compared to making separate purchases
- ✓ Encourages cross-package interoperability
- ✓ Encourages Autodesk subscription model
- ✗ Problems with 2013 plug-in compatibility means subscription is a definite must
- ✗ New features among packages substantial but not revolutionary
- ✗ Premium and Ultimate edition suites worthwhile, Standard edition less so

Essential info

Price: £7,600 MSRP/$7,995 US

www.autodesk.com

OPERATING SYSTEMS
- Windows 7/XP (x64/x32)

MINIMUM SYSTEM REQUIREMENTS
- Intel P4 processor
- 4GB RAM
- 17GB HDD space
- 512MB graphics card

REALISTIC SYSTEM REQUIREMENTS
- Intel i5 processor
- 8GB RAM
- 17GB and HDD space
- 1GB graphics card

Maya 2013 features Viewport 2.0, a significant performance upgrade, offering a higher-fidelity interactive environment to assist creative decisions

Our verdict

Features	9/10
Ease of use	10/10
Quality of results	10/10
Value for money	9/10

"A logical and cost-effective way to enter the world of Autodesk software, though subscription is certainly a must"

Final Score 9/10

Maxwell Render 2.7

Next Limit's top-tier render engine gets updated to feature a new Grass module. Find out what makes the latest Maxwell Render Suite so special...

In this image the new Grass feature in Maxwell Render 2.7 has been used in conjunction with the excellent sunlight system to create this outdoor scene
With the Disc
• Maxwell Render for SketchUp trial plus video tuition
• 20% discount off full version

The Maxwell Studio application enables fine control over lighting and material editing

Plug-ins are available for all of the main 3D packages. Here modo is being used to trigger a Fire preview

Maxwell is a leading physically-based renderer and Next Limit has been releasing frequent incremental upgrades that keep adding new features to this already excellent package. With the advent of version 2.7 it's the Grass/Fur module that's the headline.

What makes Maxwell special is the realism of its results, which are a big step above any non-physically based render engine. The program is also relatively easy to learn, especially since there are very few render settings to deal with. In Maxwell it's simply a case of hitting the Render button, rather than fiddling with parameters. The one area where you'll really benefit is in the creation of materials, because these are complex enough to be able to reproduce many real-world characteristics. Luckily there is a vast material library available as well as a very good wizard system within Maxwell Studio (part of the Maxwell Render Suite) to help beginners get started, so it's possible to get top quality results quickly.

Lighting in Maxwell is physically-based, which means that there are no CG lights or faked speculars, light must come from emitters and highlights are created by reflection and controlled by material roughness. This combination creates very realistic lighting and materials. There is also an excellent sunlight system with comprehensive controls for atmospheric conditions that enables beautiful simulations of daylight.

The Fire interactive preview system enables real-time tweaking of lighting and materials from within the Studio application or from a host program. This provides a very efficient workflow for texturing and lighting, giving full quality previews interactively, consequently reducing the need for frequent test renders.

Over the last few releases many kinks have been ironed out, for example SSS speed and quality has been vastly improved in the last couple of updates. The only problem that we have found is that refractive caustics take far too long to render. It's only a minor problem and one which Next Limit is surely working to improve, but if you want to render realistic underwater caustics, for example, it wouldn't be practical. For a render engine of Maxwell's quality this is potentially quite a shortcoming.

*Version 2.7 is available free to all existing Maxwell Render 2 customers

The Grass feature

Your CG garden has never been greener

The new Grass feature is very easy to set up from within Maxwell Studio: simply select an item and add the Grass modifier, then adjust the parameters for length, density, materials and so on. It is very simple to use and tweaking settings is quick when used in conjunction with Fire.

Our verdict

Price: $995 US*
www.maxwellrender.com

Features	8/10
Ease of use	8/10
Quality of results	9/10
Value for money	6/10

> Maxwell is one of the very best rendering solutions available anywhere

Final Score 8/10

Workstation Specialists WS1850

An NVIDIA Maximus workstation that sacrifices some general performance in the name of affordability

Rather than two processors, Workstation Specialists' WS1850 features an NVIDIA Tesla card

Since Intel launched its range of Sandy Bridge Xeon E5 processors, workstation manufacturers have been eager to accommodate them in highly capable dual-processor systems, such as the Boston Venom 2000-7T. But Workstation Specialists' WS1850 is different. Although it's similarly priced, it only uses a single processor rather than two, an Intel Xeon E5-2670.

This impressive CPU has eight physical cores (sixteen virtual threads), 20MB of level 3 cache and a base clock frequency of 2.6GHz. Thanks to Intel's Turbo Boost Technology, this increases to 3GHz when under load, or 3.3GHz if a single core is used.

Instead of having two physical CPUs, the WS1850 is a fully certified NVIDIA Maximus workstation, with a Tesla C2075 compute GPU paired with its main graphics card, an NVIDIA Quadro 4000.

A powerful graphics card in its own right, the Quadro 4000 has 256 CUDA cores, 2GB of graphics memory and a 256-bit memory interface. In addition, Workstation Specialists has provided 32GB of (non-ECC) DDR3 memory arranged in a quad-channel configuration, with a 120GB Intel 520 series solid-state drive (SSD) for the operating system and a 2TB hard disk for project files. Helpfully, a Blu-ray writer and card reader are also included.

The chassis can be customised to be used as a rack mount unit or a desktop tower. Our only minor complaints are the lack of USB 3.0 ports at the front (there are only two at the back) and the small SSD. 120GB can fill up quickly, and since SSDs are now less expensive, we'd expect more.

The Tesla provides a big performance boost in applications that support it, including 3ds Max, Maya and some functions within the Adobe CS6 suite. While the Tesla handles final renders in the background, processing them much faster than the CPU can, the Quadro is fully or partly dedicated to the application's interface and operating system, so the system doesn't become unresponsive, and you can continue manipulating scenes and materials.

As we expected, with only a single processor, the WS1850 performs worse in many benchmarks than similarly priced dual-processor systems. Its CINEBENCH rendering score of 11.94 is roughly half what the Venom 2000-7T achieved. Its SPECviewperf results fell short as well. These benchmarks can't really measure the benefits of a Tesla card, though.

Many NVIDIA Maximus workstations are too expensive for small design firms. The WS1850 changes this, and is an alternative to a general-purpose workstation, if you depend on software that supports Maximus.

Our verdict

Price: £4,999 (ex VAT)
www.workstationspecialist.com/workstations/ws_1850

Features	9/10
Ease of use	8/10
Quality	8/10
Value	9/10

> The WS1850 is for those using software that supports NVIDIA Maximus

Final Score 8/10

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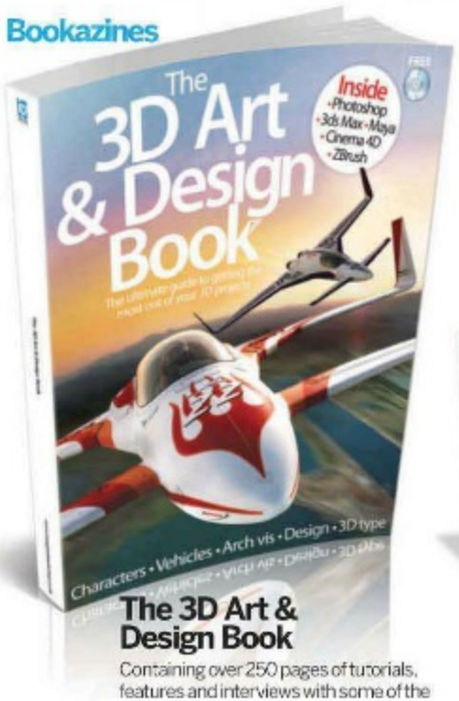

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We talk to the young souls at Lost Boys Studios about learning the finer elements of Hollywood-level VFX production
'The Island Keeper'
Students at ArtFx created this ten-minute short about a captor struggling to escape his island prison, only to be confronted by an impressively created CG monster that dwells deep beneath the surface of the lake
www.artfx.fr
www.facebook.com/TheIslandKeeper
© ArtFx
We had only four days to shoot more than 60 scenes – including the underwater scenes! Of course, just as we feared, the worst happened...
Project lead Aude Cabannes discusses the dangers of on-location shooting, and how post-production VFX can help overcome those troubles, in this month's Project Focus. Page 105

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Aim Assist explained

"Aim Assist technology allows for simple, single-user aiming and calibration," says Brian Nilles. "One-button push brings the camera view to full screen in the software, sets the image to greyscale and optimises it for visibility. The image is so clear that placing reference markers on the capture volume floor only to pick them all up again before calibration, is no longer necessary."

The specifications of the Prime 41:

- 4.1MP resolution
- 180 fps capture rate
- Global shutter
- 51 x 51-degree FOV
- 80-foot capture range
- Built for real world use!

OptiTrack announces the Prime 41

The first mocap camera in OptiTrack's Prime series is set to change the industry

A The RGB LED mounted on the camera face indicates the camera's status changes. Users can program it so that a red light flashes when the camera is out of calibration, for example

B The Prime 41 started shipping on the first day of SIGGRAPH and is the flagship product of a planned line of all-new cameras

C Each of the Prime 41's sides has a handle, but also acts as a stable base to rest the camera on. The camera will also automatically detect its orientation and adjust itself accordingly

"Everything about the Prime 41 was designed to make you say: 'I can't believe I've had to live with anything else'." This is Brian Nilles, chief strategy officer at OptiTrack discussing the company's first camera in its new series, the Prime 41, a motion-capture camera that promises to change the way filmmakers think about the process. "We considered the complete timeline of a motion-capture camera – from unboxing to setup, capture and teardown. Each process was accommodated with a nod to simplicity and usability," says Nilles. "It's a process that has yielded the most powerful and intuitive 4.1 MP camera ever built."

Along with the mocap essentials you might expect, such as on-camera image processing, a global shutter, external sync, high-transmission lenses and more, the Prime 41 comes with a range of unique features that have not been seen before with this kind of technology. "In terms of raw performance, the Prime 41 is a large-volume juggernaut, able to track a 16mm mocap marker from more than 80 feet away," says Nilles. "When combined with our proprietary fast glass lens technology and powerful IR strobe, it can yield capture volumes up to 75 x 150-foot from a perimeter-only camera setup – with precise, noise-free data throughout."

This impressive technology is bolstered by innovations such as OptiTrack's on-camera Aim Assist and a new on-camera visual alert system, which provides visual feedback on camera health and activity based on a ring of programmable LEDs mounted on the camera face.

OptiTrack is offering all of this at half to a third of the price of its nearest competitor. "People have been trained to expect to pay a lot to get a lot. The Prime 41 will turn heads for bucking that trend so aggressively," says Nilles. "The price [to] performance ratio completely changes the way that VFX studios, game developers, universities, labs and the military look at their requirements. With the Prime series, even clients that are spec-ing out a top-tier system no longer have to make hard decisions about camera type and count. That's hard to ignore."

> "Everything about the Prime 41 was designed to make you say: 'I can't believe I've had to live with anything else'"
>
> **Brian Nilles,** chief strategy officer at OptiTrack

Valve releases Source Filmmaker

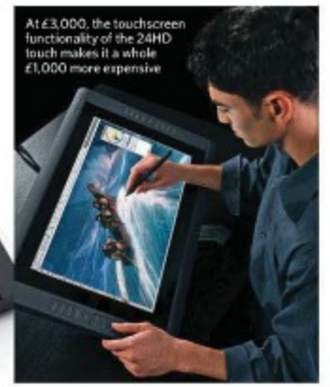
Create your own Team Fortress shorts for free

Valve, the highly influential videogame company behind such titles as *Half-Life 2*, as well as the industry-changing digital distribution platform Steam, has continued its philanthropic efforts in the videogame sphere with the free release of the Source Filmmaker machinima tool. Used professionally by Valve to create promotional shorts, the software can now be utilised by anyone to create their own movies through a range of animation-editing tools and recording software. You can get the software, completely for free, at http://sourcefilmmaker.com.

Wacom extends its Cintiq range

The Cintiq 24HD touch and Cintiq 22HD are the latest additions to the family

Wacom has announced two new entries into its Cintiq range – the Cintiq 24HD touch and Cintiq 22HD. The Cintiq 24HD touch is a sister model to the Cintiq 24HD (released earlier this year) that now adds gestural controls with a multi-touch display to enable users to manipulate work by spinning, pinching and moving it around. The screen also displays 1.07 billion colours, compared to the 24HD's 16.7 million. These extra features aren't cheap, though, with the touch coming in at a whopping £3,000. The 22HD is less expensive at £1,600 and forms a direct replacement for the 21UX, with an improved LED backlight panel.



Software shorts

Bringing you the lowdown on product updates and launches

SprayTrace

Holomatix has launched SprayTrace, a plug-in for Maya that provides an instant, real-time preview of a mental ray scene. Users are able to make informed decisions throughout the materials, texturing and lighting process, with their changes updated in the SprayTrace preview window immediately. The SprayTrace window is entirely faithful to the mental ray render, at preview quality. The software is out now for £300. Visit www.spraytrace.com.

Project Geppetto 2

Autodesk Labs has rolled out the latest update to its work-in-progress crowd simulation system for 3ds Max. Project Geppetto 2 enables users to build characters by mixing and matching preset body and clothing parts. The update also includes a new motion-synthesis system that takes source data from motion clips or keyframe animation and interactively generates variations. Try out the tech for free over at http://labs.autodesk.com/utilities/geppetto

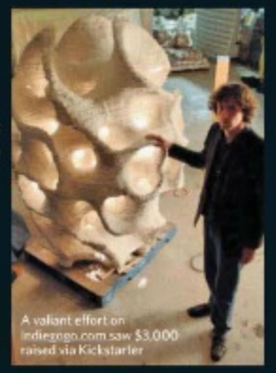
Element 3D

Video Copilot has released Element 3D, a new plug-in for rendering 3D objects in After Effects in real-time. It supports environment mapping, motion blur and depth of field and can export render passes. The plug-in also has an Array feature, enabling 3D objects to be used as particles and positioned in 3D grids, spherical clouds, rings, planes or boxes, or aligned to the vertices of an OBJ model. The plug-in is available for $150. Visit www.videocopilot.net.

Prodigious printing

The Rygo becomes North America's largest 3D-printed object

Bathsheba Grossman's sculpture, Rygo, has become the largest 3D-printed object in North America. The piece is made of limestone, stands at two metres tall, is one-and-a-half wide and weighs 300kg. This was made possible due to the world's largest printer, D-Shape; a robotic building system based on the stereolithography 3D-printing process that can print to order virtually anything it's programmed to. Rygo is scheduled to be installed at VanDusen Botanical Garden in Vancouver.



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A look to the future

Glasses-free, multi-perspective 3D media might not be all that far off...

In a new paper featured as a research highlight at SIGGRAPH 2012, the MIT Media Lab's Camera Culture group offered a new approach to glasses-free 3D that can be viewed from multiple perspectives, using several layers of LCD panels in order to produce the required 360-hertz refresh rate for a convincing 3D illusion. The technology is very much in the prototype stage, but in a few years' time we might be able to experience 3D entertainment without the need for those pesky glasses.

Image courtesy of the MIT Camera Culture group

MIT's system is extremely complex and needs to accommodate for a moving viewer

New tools

Record and stream 3D facial animation data using Microsoft's Kinect

Brekel Kinect Pro

Kinect motion-capture pioneer Jasper Brekelmans has released a new application for recording and streaming 3D facial-animation data using the Xbox game peripheral Kinect.

Brekel Kinect Pro is entirely markerless, requiring no special make-up or calibration to use. The software can track head position, rotation and jaw position and also track 11 shape units and six animation units using the CANDIDE face model. Audio can even be recorded at the same time.

Brekel Kinect Pro is available for Windows and is priced at $99. You can purchase it from www.brekel.com.

Actors' performances are reflected on the 3D model in real-time without the need for markers

"Opinion"

Prepare the ground

Why artists need to keep up with an evolving industry

Richard Shackleton of The Foundry gets us excited about the future of 3D

Richard Shackleton www.thefoundry.co.uk

What a fascinating time to be a 3D artist. The phenomenal images and projects being produced by the 3D community are meeting with rapid evolution in modelling, animation and visual effects.

The ability to view 3D sets and characters with real-time animation during shooting vastly improves directors' and photographers' ability to control the artistic intent of a project. Everyone sees a refined product and immediate creative decisions [can be made].

For 3D artists this means new and exciting opportunities as the assets they create are required earlier in the process. As we pass a tipping point, it will be a wise move for artists to learn about the changes in technology and the impact on the way 3D needs to work.

MARI, The Foundry's texturing and 3D painting tool, is software that can help towards a more streamlined workflow for artists

We have reached a level where 3D allows us to make realistic pictures. Now the challenge is how to do that efficiently and how to deliver to those that need it *when* they need it.

Learning the new generation of creative 3D tools like MARI and KATANA is a great start. Become introduced to the benefits of adopting new approaches like asset-based pipelines. Stay up to date and be prepared to deliver the best of your creativity in new places.

> "3D allows us to make realistic pictures. Now the challenge is how to do that efficiently"

Congratulations to...

The winners of the 2012 Architectural 3D Awards

'Megalomania', which won the non-commissioned architectural film category, was created by Jonathan Gales

CGarchitect.com has announced the winners of the ninth annual Architectural 3D Awards, which took place in La Coruna, Spain. Winners included LUXIGON's Eric de Broche des Combes in the Commissioned Image category, FACTORY FIFTEEN for the Non-commissioned Image category, Squint/Opera's Ryan Lintott won the Commissioned Film and Real-time awards, and Jonathan Gales took first in the Non-commissioned Film category.

Upscaling the business

Autodesk announces Scaleform for the Unity Engine

Autodesk has announced new versions of Scaleform, its middleware tool for creating gaming UI. While Scaleform has traditionally been focused on triple-A development, these new versions have been tailored for indie and mobile developers. Users are able to create UI for Unity games or third-party mobile engines, port PC Flash games to mobile or create simple iOS and Android games. Licences are available now at $295 per platform.

The new versions of Scaleform were created to address the growing interest from developers

"Project Focus"

The Island Keeper

A group of three talented students create their very own monster movie

ARTFX

Project *The Island Keeper*
Description This short tells the story of a man who escapes from an island prison, only to come face-to-face with something far more daunting. Combining live-action footage with CG integration, this is proof that monster movies can be made on a budget.
Client ArtFx
Country France
Software Maya 2012, Mudbox, Photoshop, Nuke, Boujou, After Effects, RealFlow, DMM (Pixelus), Final Cut Pro
Company *The Island Keeper* was created by three graduates of ArtFx; Aude Cabannes, Julien Malot and Charlotte Pipet. The trio spent their final year at the visual effects, CGI and 3D animation school creating *The Island Keeper*.
Website www.artfx.fr- www.facebook.com/.TheIslandKeeper.

Contributors

Aude Cabannes Project Lead, modelling, texturing, lighting, rendering, editing and colour grading
Julien Malot 2D and 3D compositing
Charlotte Pipet Concept, sculpting and CG animation
Jérémy Flandrin Matte-painting, compositing and music
Lucas Girault Compositing
Quentin Crochez Compositing
Simon Alexis Setup
Brice Lehmann Water simulation
Odélia Dardashti Modelling and texturing of the little boat
Ryan Thompson Sound Designer

Inspired by television shows such as *The Prisoner*, *The Island Keeper* tells the tale of one man and his attempt to escape from his captors, only to be greeted by something far worse beneath a large and mysterious lake.

The project was made as part of the final year for students at the ArtFx school in Montpellier, France, with modelling and texturing specialist Aude Cabannes taking the helm as project lead.

"I chose this because the underwater scenes were a real challenge, and it was something we had never done," she tells us. The shoot taught the team the difficulties that can come with on-location shooting. "We had only four days to shoot more that 60 scenes," she says. "We had two sunny days and two cloudy days. We hadn't planned to change the background in postproduction, but we had no choice."

As such, compositor Julien had to re-create the same sky and light on all scenes. Backgrounds were replaced with matte paintings, which required a great deal of rotoscoping, 2D and 3D tracking, shot clean up and plain water extensions.

As for Aude, her hands were full with the aquatic monster. "I spent two months on the modelling, one on texturing, three weeks creating underwater particles and three months on lighting and rendering," she remembers. "One of the big challenges was the thin skin around the mouth. We animated it with nCloth to stretch the skin when it opened its jaws."

The underwater scenes also posed some issues. "Underwater lighting and colours are different," says Aude. "Compositing is important to remove contrast and saturated colours, and to add glow and blur."

You can watch *The Island Keeper* at www.vimeo.com/44644180, and the making of at www.vimeo.com/44717133.

> "The fog underwater made it impossible to see what we were filming. We had to manage the unexpected!"
> **Aude Cabannes,** project lead

A "For the concept of the creature the challenge was to do something original," says Pipet. "It's difficult... because there are already so many movies... with strange creatures"

B "I worked with references, like the Kraken in *Clash of the Titans*, for instance," says Malot. "I analysed shots of movies to understand what could be effective"

C "The underwater shots... had to be created and gathered in a realistic way," says Malot. "Also, the ambiance had to correspond to the real underwater shots"

D "With the water, we used stockshots of splashes and swirls that we shot in front of a black screen," says Cabannes. "We would also create splashes during the shoot"

E "One of the most challenging shots for me was when the monster destroys the boat," says Malot. "I had to mix... splash stockshots, fluids, matte painting [and] CG elements"

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Project *Prometheus*

Description Set in the same world as Ridley Scott's seminal 1979 sci-fi film *Alien*, *Prometheus* takes place 33 years before the fateful events on the Nostromo. Here, another rag-tag crew of space explorers head to a dark and unknown planet in the hope of discovering the origins of mankind. Instead, they are faced with its very destruction...

Country UK

Client Twentieth Century Fox

Software used Maya, NUKE, Flowline, RenderMan, mental ray, ZBrush, MARI, Photoshop

Key people

Richard Stammers VFX supervisor
Charley Henley VFX supervisor
Marianne Speight VFX producer
Matt Middleton CG supervisor
Ferran Domenech Animation supervisor
Julien Bolbach Environment lead
Joan Panis FX lead

Although some fans may have been disappointed with Ridley Scott's latest foray into the world of his successful *Alien* franchise, there should be few who feel the need to criticise *Prometheus*' stunning CG visuals.

Ranging from panoramic space vistas to melting helmet visors, powerhouse post-production facility MPC was responsible for 420 shots, many of which could be considered some of the finest CG work achieved in the genre so far.

"*Alien* is famous for its practical effects, so we knew *Prometheus*' visual effects would come under scrutiny," says MPC CG supervisor Matt Middleton. "The team was incredibly dedicated to doing justice to Ridley Scott's return to sci-fi."

First the team at MPC had to create the world. "For the space shots, Ridley had references of Saturn and one of its moons," says environment lead Julien Bolbach. "He also spoke to NASA scientists to get an understanding of its environment and climates. We carried out extensive research on things like pictures of Earth from space, Jupiter's surface, clouds and storm photos, but we also explored more exotic paths, looking for coloured fluids, waves, skin and blood vessel patterns. The main concept behind the space shots is that the LV system is in turmoil, dynamic and changing, almost like a living organism. We looked at anything that helped convey that feeling."

The eponymous ship Prometheus – "a fragile little toy within this moody, stormy and uninviting background" – also had to feel simultaneously fantastical, while grounded in reality.

"[Getting] enough detail to cover the close-up human scale shots while also building the entire 500-foot ship was a challenge," says Middleton. "The whole ship was around three million polygons. There were over 120 UV tiles, each with a set of 8,000 MPS produced in MARI, Photoshop and NUKE. A multitude of shuttle, plane, and even a little Nostromo reference was used to develop the concepts into a photoreal ship. It was then fully raytraced in RenderMan with area lights, PTC-based GI and a multitude of tricks, such as using the RenderMan shading-rate-refinement strategy to get crisp displacement details."

The 1,000-foot Engineer craft, named The Juggernaut, posed the MPC team with a similar challenge, requiring a huge amount of detail. "We received good orthographic art department concepts and a ZBrush concept, but the 3D realisation of a clean model in Maya was tricky," says Middleton. "The texturing and surface displacement was lead by Paul Nelson and the flow of the pipes painted in MARI. Keeping the pipes as displacement and not geometry meant we could use one shader setup for near and far shots, with RenderMan's MIP mapping taking care of the varying level of detail."

MPC was also responsible for several of *Prometheus*' action-heavy sequences, such as the moment when the two ships collide. "The ship crash and rolling were heavy sequences to work on as there were so many elements to create," says FX lead Joan Panis. "The initial impact was created in Kali [MPC's in-house proprietary destruction tool] but we also added additional particles and particle instances to make the whole effect richer. The explosion was achieved using Scanline's fluid solver Flowline. We made the explosion interact with the ships so that it wraps around them and composited real live elements into the rendered explosion elements to give it the final impressive look."

Overall, Middleton is extremely proud of what was achieved at MPC. "It's not often that you get opportunities such as this. We all recognised that, and really dedicated ourselves to it." You can read more about the creation of these sequences and much more in our in-depth, exclusive interviews featured on www.3dartistonline.com.

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> "Alien is famous for its practical effects, so we knew Prometheus' visual effects would come under scrutiny"
> **Matt Middleton,** CG supervisor

Portfolio highlights

Just a few of the big-budget movie projects MPC has worked on:

2012 *Dark Shadows*
2012 *Wrath of the Titans*
2011 *Harry Potter and the Deathly Hallows: Part 2*
2010 *Prince of Persia: The Sands of Time*
2008 *Quantum of Solace*
2007 *Sunshine*
2005 *Batman Begins*
2004 *Alien vs. Predator*

A "The sandstorm was a complex fluid simulation developed in Flowline," says Middleton. "We started referencing real sandstorms but they weren't suitably dynamic or dangerous, so pyroclastic clouds were referenced instead"

B The MPC team was tasked with creating the environment for the planet LV-223, based on concepts from Ridley Scott. A digital version of the Wadi Rum valley in Jordan was created in Maya to provide these rock formations

C "The visual effects work had to strike a hard balance of being epic and alien while also being believable," says Middleton. "Ridley was very explicit about that"

D "For the rolling Juggernaut we had falling debris that created small impact explosions," says Panis. "We had built a library of these and timed and placed them according to where the debris hit"

E "For the space shots we tried to remove any elements that looked too Earthy," says Bolbach. "We added extra elements such as electric arcs, or clouds with strange shapes"

F "A full-3D Silo model was built and rendered in RenderMan, which consisted of the Silo interior, Silo doors and ground terrain that matched the on-set shoot in Iceland," Middleton explains

G "Prometheus [the ship] was very heavy to render," says Panis. "To optimise we only used a third of the ship as it quickly gets engulfed in an enormous ball of flame. As such no additional simulation was needed," says Panis

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Industry insider

Medical 3D artistry

Scientific illustration

Meet Matt Briggs, an artist using a digital scalpel to re-create the complex inner workings of the human body to educate doctors-to-be and patients alike

About the insider

Job Medical and scientific illustrator
Location UK
Education BA (Hons), MMAA and RMIP qualifications
Company website 3dmedicalillustration.com
Biography Having studied Traditional Scientific Illustration, graduating in 1999, Matt Briggs has since been expanding his expertise with digital media. His skillset now includes everything from matte painting through to 3D modelling and animation

This is one of Briggs' painted works created with acrylic paint and pencils

Medicine and art may not sound like the most likely of bedfellows, but the field of medical illustration has actually been alive and kicking for centuries. Of course, it's quite a different beast now than it was in the days of Da Vinci's *Vitruvian Man*, with great advances not just to the doctor's toolkit but also the artist's.

When creative Matt Briggs first started learning his craft, painting was still the de facto medium for producing anatomical studies. But over the course of his career there has been a steady shift from 2D media to digital software.

Briggs now uses a plethora of both modelling and editing programs in his day-to-day workflow, including ZBrush for sculpting and texturing, Blender for illustration and animation, occasionally Octane for rendering and the Adobe Creative Suite for post-production work.

Nevertheless, Briggs is adamant that 2D still has a role to play and that the key skills needed to get under the skin of medical illustration are universal. Asked what he believes are the three main qualities to be a scientific illustrator, Briggs replies: "The technical ability to draw and visualise anatomy, the determination to develop your illustrative skills as much as possible, and a genuine passion for anatomy and medical art."

3D Artist: *Originally you worked with traditional media such as paint – what was it like making the transition to digital?*

Matt Briggs: The transition to digital art was quite gradual throughout my education and professional career. Illustrator and Photoshop illustrations were produced alongside hand-painted acrylic illustrations. The transition into 3D was more immediate and I found it very difficult to decide which software and hardware I should use. As an avid Mac fan I initially chose Maya, but eventually discovered Blender, which I found much easier to use.

Do you think 3D formats have more to offer than their 2D counterparts?

There are definite advantages to both 3D and 2D. The biggest advantage 3D illustration has is the ability to show an accurate representation of movement and depth. It can also create levels of detail that would be very difficult to achieve using traditional methods.

However, hand-painted 2D illustrations tend not to date as quickly as 3D illustrations and have a nice soft effect that is difficult to create using digital methods. Traditional 2D illustrations also tend to have a simplicity that is more suited to educational material [aimed at patients].

What kind of feedback have you received?

The feedback I get from clients and the general public about my illustrations is extremely positive. Illustrations have been an essential part of medical education for centuries; any doctor or surgeon will tell you how important a role medical art has played in their education.

What would your dream project be?

My dream project would be to develop the world's most detailed 3D-illustrated hand anatomy [or] surgery atlas using cadaveric specimens and guided by established hand surgeons [or] anatomists.

Where do you see medical illustration in ten years' time?

Medical art has gone through enormous changes over the centuries, mostly due to [leaps] in technology. The last 15 years or so have seen a huge increase in the amount of 3D used in medical illustration. This [could potentially] be due to how cheaply an artist can put together a 3D animation suite compared to the early days, as well as advances in the software and hardware capabilities.

I believe that 3D will continue to be increasingly used by medical artists over the next decade and, with the release of iPhone and iPad apps, and more recently iBooks, there will be more platforms that will enable artists to take full advantage of what 3D has to offer.

> "Any doctor or surgeon will tell you how important a role medical art has played in their education"

Handy man

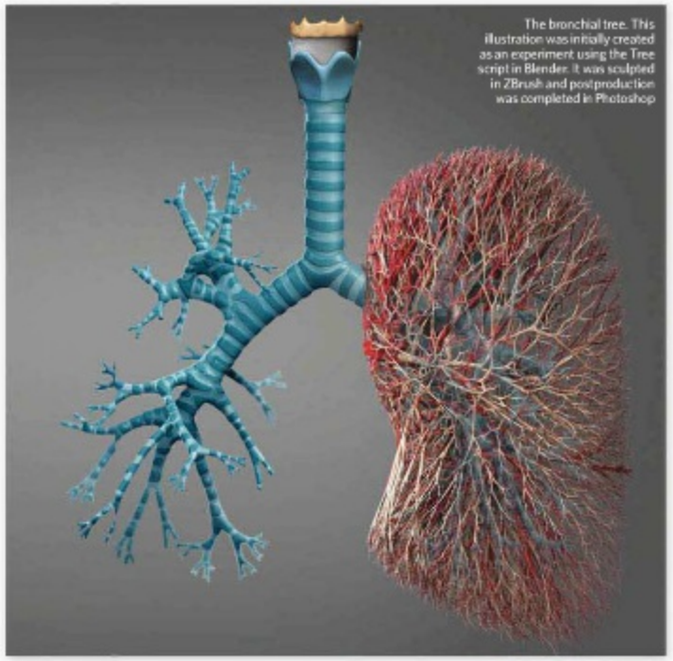
Matt Briggs gives us some first-hand insight into one part of the human body that really captures his imagination

Hand anatomy and surgery has become a big fascination of mine. My first illustration of a hand dissection was based on direct reference from a cadaver. There is no substitute for drawing direct from observation if you want to create an accurate representation of human anatomy.

Portfolio highlights

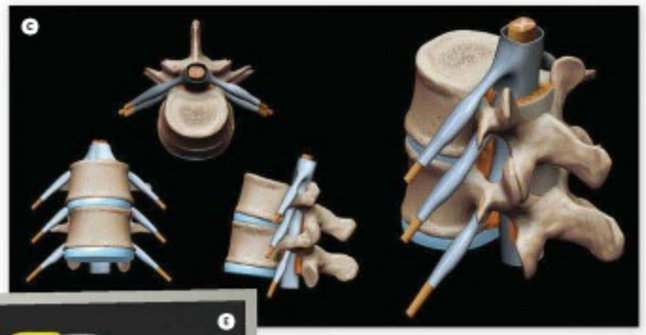
Some of the recent projects Matt Briggs has worked on include:

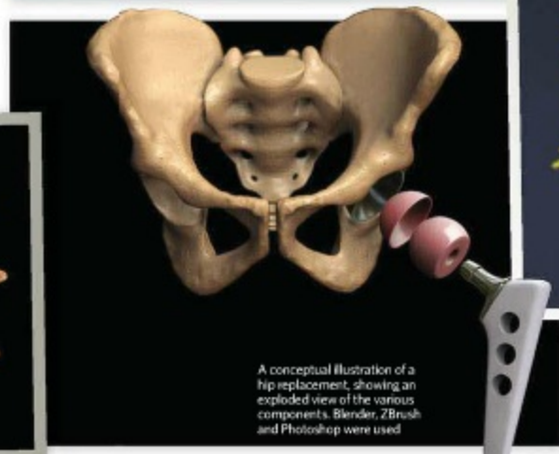
2012 'Surgical Flaps' – an app for the iPhone and iPad
2012 Surgicalillustration.com – a web-based resource for medical quizzes and 3D anatomy models
2011 A wireless device to control a prosthetic limb with brain signals for Imperial College London
2011 A cervical discectomy and fusion animation for patients
2010 Illustrations of the arterial and muscular systems of the hand for the NHS Teaching Hospitals in Lancashire



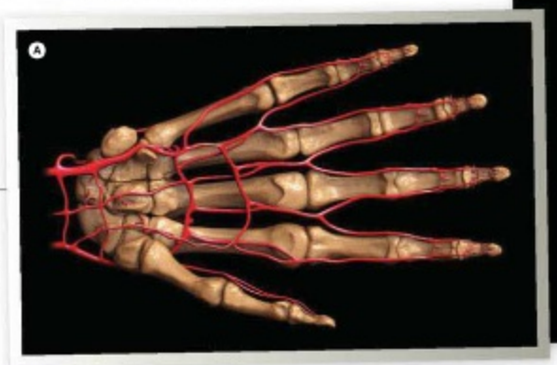
The bronchial tree. This illustration was initially created as an experiment using the Tree script in Blender. It was sculpted in ZBrush and post production was completed in Photoshop

All images © Matt Briggs





A conceptual illustration of a hip replacement, showing an exploded view of the various components. Blender, ZBrush and Photoshop were used



A This illustration shows the arterial system of the hand. It was modelled in Blender, sculpted in ZBrush and finished in Photoshop

B A simple illustration of the skeleton through the skin, created using Blender, ZBrush and Photoshop

C The lumbar vertebrae from a selection of viewpoints. Also shown are the spinal cord and dura

D Illustration of a tracheal dilator. Produced using Blender and Octane for the final render

E The cervical region of the spine with vertebral artery and nerves created with Blender, ZBrush and finally Photoshop

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Visual Effects Production Diploma

Lost Boys Studios' VFX course that imparts knowledge, skill and hands-on experience to help students on their way to a long and satisfying career within the industry

Prometheus. TRON: Legacy. Clash of the Titans. District 9. No, we're not just listing some of the most technically ambitious CG-driven films in recent years for the fun of it; these are the films that Lost Boys Studios' alumni have gone on to be a part of. *The Adventures of Tintin. Sucker Punch. The Hobbit: An Unexpected Journey.* The list goes on.

Boasting an impressive 93-percent placement rate for its graduates, Lost Boys Studios is easily one of the most eminent and successful schools currently teaching visual effects. But how does it achieve such impressive results? It is all thanks to an immersive and focused ten-month course that gets right to the heart of what it means to be a visual effects artist in today's industry.

The mission statement is simple and to the point: to provide expert photorealistic visual-effects training resulting in employable artists with professional-looking portfolios. This is achieved through an atmosphere that actively encourages curiosity, investigation, problem solving and invention – the key skills required of any successful artist looking to develop lifelong skills.

Training predominantly with NUKE and Maya, Lost Boys Studios offers a mixture of traditional classroom training techniques with project-based learning and mentorship. VFX techniques taught include modelling, texturing, lighting, 3D camera work, shaders, rendering, animating, rotoscoping, tracking, compositing and a great deal more. Weekly Industry Studies classes bring students together to view current media, breakdowns and techniques from real-world industry examples, and there are weekly screenings where finished and work-in-progress projects are presented and discussed.

Students will also earn a great deal of experience in the field, scouting locations, shooting stills and video, and even prepping a set, doing lighting tests, shooting green screens and helping out with some acting, if they're so inclined. Last year, for example, several of the class and alumni teamed up to create a horror film in 48 hours for a Bloodshots Canada competition – you can see the spine-chilling results at http://tinyurl.com/bloodshotscanada.

It's through this combination of in-depth learning and real, hands-on experience in both the studio and in the field that means students leave Lost Boys Studios with not just knowledge, but real skills in the filmmaking and VFX process. The studio's motto really does ring true: "Divine creators in the making".

Lost Boys Studios' program is led by Mark Bénard. With over 15 years of experience, he prioritises an open mind and new experiences

The program primarily focuses on the use of NUKE and Maya to create photorealistic VFX, supplemented by speciality software

> "Anyone who's lucky enough to get training like this would truly have an edge on the competition"
>
> **Trevor Adams,** VFX technical director and supervisor, Leviathan Studios

Picture perfect

Lost Boys Studios is located on the edge of historic Gastown in the city of Vancouver. Vancouver's visual-effects industry is currently booming with more and more companies continuing to open studios there, and many are within walking distance of the school. These aren't just small production houses, though: ILM, Sony Rhythm & Hues, MPC, Digital Domain and Method Studios to name a few have recently opened branches – or are planning to in the future – in Vancouver. The majority of Lost Boys Studios' graduates find work in the industry in Vancouver upon completion of the course.

Course details

Name
Visual Effects Production Diploma
Length Ten months
Website
www.lostboys-studios.com
Fees
$27,900 CAD (Canadian students)
$29,900 CAD (International students)
Entry requirements Recommendation letter, personal statement and portfolio

STUDENT GALLERY

From disturbing horrors through to ghostly apparitions, Lost Boys Studios' VFX course straddles a challenging and complex variety of projects to extract the best out of its students

UFO
» Pedro Colmenares
Pedro took opportunity to model, light and composite a gleaming space vehicle into an alien landscape

A

Student talk

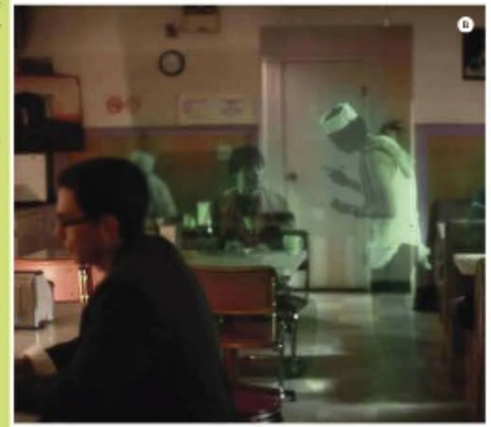
We talk with Asuha Yasuda Walsh, a student currently taking the Visual Effects Production Diploma at Lost Boys Studios

Why was Lost Boys Studios' Visual Effects Production Diploma the right choice for you?
I decided on Lost Boys based on its alumni's demos, high hiring rate and its small-class learning style. The instructors' knowledge as well as their passion... has surpassed my expectations, and I believe it's extremely rare for students to get the attention from instructors as much as we do.

What kinds of projects have you worked on – and are yet to complete – while at the school?
Our first project was a title project using NUKE and Photoshop where we learned to develop skills such as rotoscoping, camera tracking, NUKE (and) many others. We are working on our second project using Maya for modelling and NUKE for the compositing.

How would you describe the culture of the school?
It really doesn't feel like school where you are forced to sit through lectures and a lot of homework for grades. It's a studio where potential VFX artists gather together to stimulate one another's creativity... It is also a place to have fun with friends who share the same passion for films.

What are your hopes for employment once you finish?
Very hopeful indeed. There is still much to learn, of course, but [Lost Boys'] concentrated learning style helps us to focus and apply our newly acquired skills to actual projects. In addition to its primary focus on compositing, Lost Boys has a number of training resources in other aspects of VFX, so I am confident that [it] will prepare each of us for the real production world.


B

C

D

Cerebral Static
» JongJun An
This image was taken from the 48-hour horror film project. JongJun An worked for hours, painstakingly stitching these twins together with his incredible compositing skills

A *Scrooge*
» Gregory Watkins
"Trying to track the smoke effect to the ghost was very complicated... It required creating multiple tracking points and several smoke layers," Gregory explains

B *Ghost Diner*
» Shane Kao
In this project Shane blended together live action, green-screened actors and smoke. He created 3D projections to display the ghosts on different viewing planes

C *Still Life*
» Kishor Joshi
The focus of this project was to create weathered textures with photorealistic shaders and lighting. Kishor placed the object into a VFX sequence seamlessly

D *Asylum*
» Michaël Balzer
"I was inspired by the dream sequences in *Harry Potter* (films) and the... Nightcrawler in *X-Men: First Class*. I (used) ink and fire elements to portray my ghostly apparitions"

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